WRITING a column is just nobody's business. Those who do read it usually feel that the writer had no concrete knowledge of plant operation or sales. Usually a columnist gets letters. We get a few,—about nine a day. Answering 270 letters a month, in fact even reading them, gives one an impression or two worth recording. It usually gives us several if the congregation is willing to listen.

This month's mail, for example, ranges from manufacturing celluloid in Mexico to financial reorganization of a well outfitted plant. It includes sixteen letters asking "where can I buy such an article". Twenty-four asking where and how can a certain article be made economically and with the utmost satisfaction, about fifty asking the names, prices and methods of material and equipment, and the remainder devoted to everything under the sun.

To the best of our knowledge, we have received but two letters about this column. We now humbly beg for more, requesting an honest opinion of what has been written and, if possible, a thought for future writings.

To go back: our pet subject is not price cutting, but it arises more often than any other because there is more of it. Lack of faith has been unanimously chosen to occupy first place in our minds and on our pen. There is too little faith in business generally. That cryptic bromide "if a man says his word is as good as his bond, take his bond", has become almost universally practiced. The bitterest pill, by far, is to see one friend doubt another, even when a particle of cause appears.

We recently ran through a plant in a great hurry, and on leaving, asked our host how his contracts were worded. "We haven't any" was his reply, "all my customers are friends".

A thought! It takes faith—and friends—to conquer every business battle. But one could do without the friends!

The Publishers.

PLASTICS
& MOLDED PRODUCTS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 5 OCTOBER, 1929 No. 10

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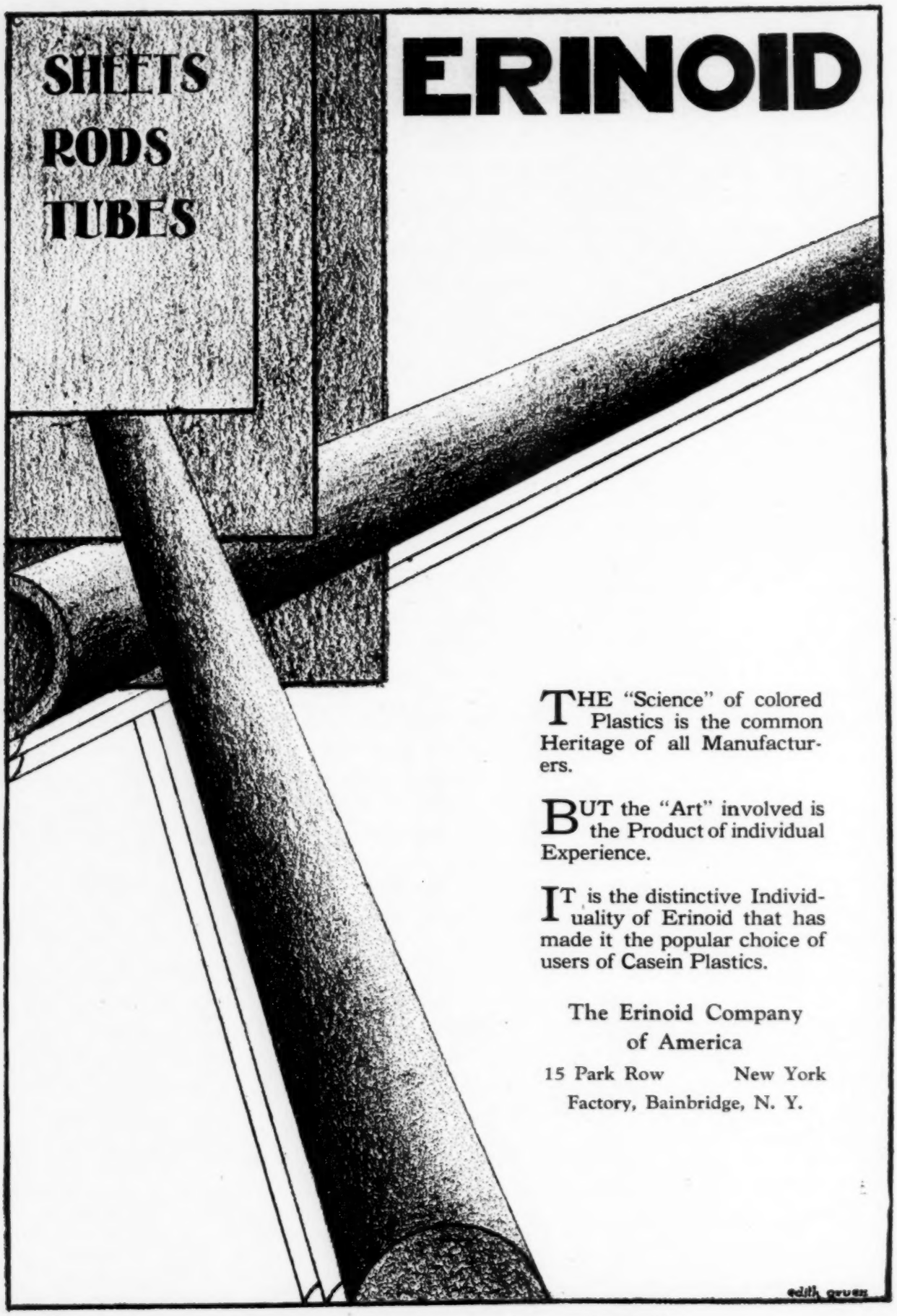
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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 5 OCTOBER, 1929 No. 10

Plasticizers, Plastics and Plasticity

Chemical and physical considerations that endow certain materials with plastic properties

By Paul Bary

Consulting Engineer, Paris, France

THE swelling of gels in water or the swelling of any colloid material when treated with a solvent comprises two distinct phases. The first one of these is a penetration of the liquid into the intermolecular space of the colloid with the resultant increase in volume, which may be followed, if the conditions are suitable, by dispersion of the material itself into a more or else viscous solution.

Plastification

These two phases are quite distinct, and in some instances swelling may take place without a solution actually being obtained, although usually by raising the temperature the swelling gel will liquefy. Behavior of glue and gelatin is perhaps the best known example.

Conversely, a gel may become stronger by losing water, as already outlined in the earlier portions of the article. If the solvent employed does not possess much, if any, affinity for the particles of the colloid, then in general the colloid will pass into solution without much, if any, depolymerization, but if the solvent is capable of depolymerizing or hydrolyzing the material, a distinct lowering in the molecular size and molecular weight may result.

IN the September issue of PLASTICS, we printed the first part of an article by Paul Bary on Plastification and Plasticizing, in which were discussed the various plastic materials and the phenomena of polymerization and solvatization, as well as the polymerization as a result of condensation. At that time the author also discussed the behavior of gels, especially those of the water-soluble type. The article is taken from the original French of our contemporary "La Caoutchouc et La Gutta Percha, March 1, 1929, pages 14466 to 14468.

If, for example, it is desired to plasticize the material by the use of a solvent or plasticizer, it may suffice to treat the same with a solvent to a point where it has been sufficiently expanded or swollen to yield an elastic mass which is deformable under pressure. If the fluid used for swelling contains sufficient actual solvent fluid, it then becomes possible to melt the gel at a given temperature.

It follows, therefore, that the plastification of a colloidal material, that is to say, its conversion into a plasticized condition, requires the expenditure of energy which corresponds in a manner to depolymerization. This, however, is counterbalanced in part, or totally, by the heat evolved by reason of the combination of the solvent with the material at a place where the molecule is broken. If the heat of solvatizing is greater than that of the depolymerization, the depolymerization will continue until a complete solution of the colloid in the solvent has been effected. An example of this type of swelling in solution is the behavior of gum arabic and also a dissolving of gelatin in water at temperatures above 40° C.

Solvent Action

Depending upon whether the solvent causes a swelling of the colloid or whether it acts as a direct solvent, is usually a matter of the temperature as to which phenomenon will predominate. Thus, for instance, by cooling pieces that have been heated, this will produce an effect analogous to depolymerization of the material and resultant expulsion of the solvent. Some solvents are not increased in their action by heating. In order to obtain molded pieces which will retain their shape when cold, the property of elasticity must be present to some extent. Elasticity is a property which gives a gel its peculiar nature. For instance, if a gel is produced by treating a colloidal substance with nonvolatile solvents, such gel will usually possess considerable elasticity.

According to the colloids used as a base for the plastic material and according to the properties that it is desired to secure in the finished material, two types of dispersing and swelling agents may be employed, and in some cases three types, although the same type may possess the double property of acting both as dispersing and plasticizing agent. The choice of the materials depends a good deal upon their availability and their price.

The melting of a gel really comprises the passing into solution of a solvent into a solid material forming a sort of solid solution. If the solution resulting is liquid, then the colloid is dispersed in the liquid instead of reversely, and usually considerable depolymerization of the dissolved or dispersed material takes place.

When one deals, however, with materials that are not capable of hydrolysis, then these phenomena do not play such an important role. In general, in the case of organic plastics solvents that are available at a reasonable price are used and these are further diluted by using liquids that, while not solvents, nevertheless permit of a dilution of the original solvent without throwing the colloid out of solution. This property is taken advantage of in the production of lacquers and varnishes from colloidal materials.

Pigments

For the purposes of rendering plastic materials opaque, or to provide them with a particular color or variegated aspect, and also in many cases in order to reduce the price of the finished articles, it has become customary to add relatively cheap inert materials or pigments.

The materials, however, are to be incorporated with plastic gels must be of such a nature that they will not tend to settle out during the time that the material is in the fluid stage, and also should be of such a nature that they will not interfere with the elasticity or the strength of the finished product. It, therefore, becomes a rather important question of choosing the proper pigment to employ in any particular case. A number of researches have been undertaken during the past years in an attempt to throw some light upon the effect of the materials added to plastics and how far the addition of these materials modifies the properties of the materials of which they form a part. Two general principles have been evolved, one, that the degree of granulation of the added material should be as small as possible, and secondly, that the material used as a pigment should necessarily be molded or ground into the plastic in order to produce a more uniform incorporation.

In case of adding a pigment to a liquid material or a product containing at least one liquid constituent, it is necessary, in order to secure a proper admixture, that the charge on the surface of contact between the pigment and the plastic be negative. Such an addition will, if it is a matter of dissolving a solid in a liquid, or the swelling of a solid by a liquid, give rise to a chemical reaction between the two bodies. If, however, the material added is not affected in any way and is inert, the problem is much simpler.

Surface Action

The chemical reactions between an insoluble substance and a liquid can be nothing more than superficial surface action changing the form of the substance, following which, if the product finally forms a soluble in the liquor mixture, the same will be dispersed therein and then the action will continue upon the new surface thus exposed; but if the product formed by contact of the liquid and the solid is insoluble in the liquid, then the particles of the pigment will become covered with a coating of the compound thus formed, thus impeding the action more or less and creating an intermediate substance which appears to stabilize the particles in the solution. This surface reaction is analogous to the reaction of solvatization, which we have discussed hereinabove. It is these reactions which make it possible to obtain stable emulsions of oil in water whenever the natural acid reaction of the oil has been overcome by adding a small quantity of an alkali to the water. What happens in that case is that there is a small amount of soap formed amout the outer periphery of the individual drops of oil, thus stabilizing them in the water. The surface tension of oil, in alkaline water has been shown to be negative and this gives rise to a spontaneous formation of an emulsion, because by reason of the great increase in the area of the surface tension, the substances can get into equilibrium with each other at a point where the tension between the same is practically nothing.

Such emulsions, however, will not form of their own accord if the oil is liquid, except in the case when there are also pigments in a very fine state of subdivision, which is of such degree that the particles themselves will tend to be stable in solution. Such particles will tend to wander to interface between the oil and the water, and will there form a sort of protective coating which stabilizes the emulsion. Similar effects are noticeable when mixing pigments with various plastic materials.

VII—Self Plasticizing Colloids

We have said above that the colloidal materials in many cases are hard and pulverizable. There is, however, an exception to this rule, and the most outstanding example of this is caoutchouc. This substance exists in its normal condition in the form of a gel. That is one of the reasons why caoutchouc is considered as that type of colloid which W. O. Ostwald has termed "isocolloids." Isocolloids are substances which have the power of existing simultaenously in quite different forms, or stages, of polymerization, in which the two different types of compounds appear to be dispersed one within the other.

Let us say, for example, that one of the caoutchoucs, called *alpha*, is solid and that the other caoutchouc, termed *beta*, is more or less liquid at ordinary temperatures but is dissolved in the solids or *alpha* caoutchouc This, therefore, gives rise to a gel which is naturally plastic, and it is, therefore, proper to term such a material as a "self-plasticizing colloid." Though there is no essential difference between the forms of the gels formed that way and those resulting from the solution of a substance having a distinct nature, it appears, however, that there is the necessity for the presence of some suplementary substance which acts as a solvatizing agent. In the case of caoutchouc this role is automatically filled by resins, proteins and water that are present and bring about these conditions. When, by means of cold, the polymerization of the isocolloid reduces the relative quantity of compound, *beta*, the plastification becomes less until finally it disappears altogether. It will be noticed that the impurities in the natural caoutchouc appear to act as solvatizing agents and that this is probably the reason why artificial caoutchouc or synthetic rubber does not possess the elastic properties that are an essential feature of natural rubber.

VIII—Conclusions

To produce a plastic material, therefore, requires the presence in the mass of a mixture of two distinct and separate compounds, namely, (1) a swellable colloid, and (2) a liquid soluble in this material and capable of dissolving it.

This liquid may be a mixture of two or more liquids, each of which has its own proper action so that there will be a change in the conditions which will be dependent upon the relative amounts of the liquids and to the extent of which one of them causes the swelling while the other one tends toward solution, and it is this counterbalancing of these forces that lends plasticity to the material. We believe that a clear understanding of the causes that produce plastification will aid considerably in determining the proper formulas to be employed to produce comparatively simple plastic masses, since in the solution of a colloid the two effects may be counterbalanced against each other so as to lead to produces having the desired properties.

Practical Applications

From the foregoing it appears that many substances not as yet employed as plastics may prove suitable that what has been above set forth is applied practically. Hitherto much of the work in plastic materials has been that of the hap-hazard inventor who attained his results more by good fortune and persistence than by the application of sound scientific reasoning. Many of the synthetic resins were mere slavish attempts to follow in the footsteps of the pioneers in the field without a true understanding of the real problem to be solved. It appears almost certain that the plastics of the future will always consist of at least two substances which are capable of dissolving one within the other, and that unless this is kept in mind the mere production of synthetic resins or synthetic substances alone will not lead to a real solution of the problem. Many of the plastics of today are inherently brittle by reason of the fact that the binder consists of a more or less pure homogeneous substance. Thus far nothing to equal rubber has been found, nor has shellac met any synthetic rival. A proper understanding of the laws of plastification is, therefore, a prime prerequisite for the development of novel and useful plastics.

The purely theoretical and mathematical phases of the problem are usually too abstruse to the ordinary reader, but no real practical progress in this art can be realized without taking everything into consideration. (Editor).

Plasticized Hard Rubber as a Coating for Submarine Cables

EXTRUSION of plasticized hard rubber composition about a continuous cable, rather than resorting to the application of the rubber followed by vulcanization, is an interesting example of modern development in the application of plastic materials on a large scale for industrial purposes. While the method is described in connection with a particular form of hard rubber that has been sufficiently plasticized to permit extrusion, there is sufficient interest in the method adopted to act as an incentive to the working out of similar problems with other plastic materials.

Covering Cores

The invention, as far as the plastic features of it are concerned, comprises the continuous extrusion of a plastic material about an advancing core of cable, properly covered with the necessary magnetically permable alloy and other insulating materials. The inventor, Robert R. Williams, of Roselle, N. J., describes it as follows in his patent U. S. L, 689,312; Oct. 30, 1928, assigned to the Western Electric Company.

Ronite

La Ronite, a company of Rosny-Sous-Bois, France has applied for registration of a trademark on a condensation product of Phenol and Formaldehyde. The name is RONITE. Use is claimed since May 11, 1927. Application Ser. No. 260,574, Jan. 24, 1928; published April 30, 1929.

Natural Silk Solutions

Magnesium nitrate solution used to produce colloidal silk products

SOME time ago we described the preparation of plastics and artificial filaments from chitin (the shells of such creatures as crabs, lobsters, shrimp, etc.) by dissolving the same in solutions of various salts such as thiocyanates (**Plastics** 1927, Vol. 3, pp. 269,-328,329). The use of silk itself as a plastic was described in another article (**Plastics** 1927, Vol. 3, p. 109.

Now two Japanese investigators, Tomenosuke Muto and Saburo Hida, have succeeded in preparing colloidal dispersions of silk, from which filaments, thin films and plastics may be prepared. (U. S. P. 1,714,039; May 21, 1929; filed Feb. 21, 1928 and in Japan Dec. 15, 1927). The silk is put into solution by means of magnesium nitrate.

Dialysis Used

About ten parts of magnesium nitrate are dissolved in five parts of water and this solution is heated to a temperature of about 110° C., then two or three parts of waste silk threads divided in several small quantities are successively added, dipped into the magnesium nitrate solution and stirred gently and dissolved to form a suspending colloidal solution. After that the magnesium salt added is separated and expelled from this suspending solution by dialysis or other ordinary separating method. Dialysis is the preferred method and is accomplished by simply placing the solution in an unglazed earthenware pot surrounded by pure water. Under such conditions, the magnesium nitrate passes through the pot into the water whereas the colloidal silk remains behind. The method of separation by dialysis is a well known colloidal chemical process and needs no further description. The suspension of natural silk thus formed is now concentrated at a comparatively low temperature. To re-gain silk threads from this concentrated liquid silk the liquid is withdrawn as a fine thread through spinning nozzles in apparatus like that used in artificial silk making industry, and the thus spun threads are then drawn into coagulating solution bath such as acetic acid, methyl-alcohol or other known dehydrating agents. In other cases thin paperlike sheets of natural silk can be made by spreading the concentrated liquid silk over a flat surface such as glass plate and drying the film. A suitable quantity of gelatin, glucose etc. may be added either before or after the expelling of salts to modify the strength and elasticity of the finished thread.

Novel Safe Preforming Press Has Non-jamming Device

IN using preforming presses, variations in the relative "moistness" and compressibility of the molding powder often leads to inordinate strains on the press, sometimes even to breakage or other damage.

We believe therefore that a new attachment to their well-known preforming preses, perfected recently by the F. J. Stokes Machine Co. is of more than passing interest to molders and others of our readers.

This device is an automatic excess pressure release and is the direct result of a special survey and study of machines in operation under various conditions. Preforming presses must be more than rugged and "fool proof" and the new pressure release is a long step in this direction.

Jamming Prevented

The device referred to, (patents pending,) maintains the necessary pressure but when an overload is present it absorbs the strain which would jam and possibly break even the most rugged machine. Jamming of the machine and break-downs due to overstrain of parts are entirely eliminated and the device can be supplied as standard equipment with any new press ordered or any Stokes Press can be returned to the makers and have it added here at their plant.

Several of the reasons for demanding such a feature have been lack of care, including rare lubrication, the type of labor employed in this department of the molding plant and, most important of all, the very considerable variation in molding compounds from one drum to another. This latter factor has, in the past, stalled and jammed many a machine and if it has not previously strained the machine or broken it, it at least ties up production while all hands turn to with crow-bars to "back it off" of compression.

This excess pressure release is standard on all Stokes Rotary Preform Presses for production work and, as a result, saves users considerable grief. Rotary Preforming Presses are being supplied in a number of different sizes and capacities, a thousand preforms per minute being possible on certain models. The larger Rotary Preforming Presses are being used by several of the largest electrical manufacturers for preforming balls approximately 1⅛" in diameter. This shape of preform has the advantage that it can be fed by gravity and automatically to the molding press.

Application of Science to Industry

Coordination of research, technical control and investigation of the commercial applicability of a new product or process essential to success

By G. E. Landt

Diamond State Fibre Co., Bridgeport, Pa.

It is our belief that there is so much truth and instructive criticism in this article that its reproduction here, from Industrial and Engineering Chemistry (by permission) is fully warranted.

The Plastics industry is just the kind that needs this type of co-operation most.

WHILE modern industrial society is the first born of the scientific era and is already a centenarian, the attempt of American industries to apply science in the form of research directly to industrial problems is very young, probably not yet of legal age. An immense amount of propaganda is being broadcast, assuring us of the benefits to be derived by our industries when they are equipped with well-organized technical and scientific research laboratories. We are assured that this development will result in a huge monetary benefit, but as an additional goad to action the specter of failure and bankruptcy is held up to those who do not keep in step with the times.

Keeping Up To Date

These two contentions are undoubtedly true. There is no important industry in the country which has not been greatly benefited by scientific research, even to the extent of the birth of new industries, specific among which are the automobile, the rayon, the dyestuff, the radio, and now the newest arrival, the airplane industry. And it is also not to be denied that, since new discoveries imperil old established industries, these old industries must stand as a safeguard in the forefront of discovery unless they wish to be wiped out.

Opposed to this propaganda is the experience of many industrial leaders who add technical and scientific personnel to their organization. Frequently their plans meet with disappointment. Their business is not revitalized. New and profitable inventions are not forthcoming. Activities stretch forth into a never-ending series of meaningless technicalities, and perhaps the only element of satisfaction gained is the feeling that one is abreast of the time.

The technical organization is one of the newest tools that have come to industry's hand. But its development and its application to industry's problems is not yet widely understood. Too frequently a technical personnel is put to work on the visions of a guiding mind. These visions are so far beyond the realms of possibility and the aim of the business which they are to serve, that energy is dissipated, efforts are wasted, and failure is the only result.

Function of the Technical Organization

The function of a technical organization is to provide the procedure for manufacturing a better commodity at a lower cost, and to aid in extending the sale of the parent organization by so doing. Revolutionary and spectacular discoveries may or may not accompany the exercise of this function, but if the aim in financing and directing a technical personnel is the accomplishment of the spectacular failure will probably attend. Every industry has certain reasonable and normal lines of development for improving its products, lowering its costs, and putting out new products, and progress along these lines should be the chief concern of the technical organization.

On the other hand, a clear conception of the function of the technical organization and its relationship to the parent industry will do much toward reaping some of the benefits which are so widely advertised. To this end, the work of a technical organization should be subdivided into three classes—process control, development, and research. A fourth class has developed in some organizations, and should be designated as sales service.

Definite Standards

The first aim of a manufacturing organization as a means to the ultimate end of making money should be to manufacture a commodity at a definite set standard of excellence, be it high or low. Spoiled production seconds, rejects, dissatisfied customers, all are specters that hover over the graves of many departed industries. Reduction of these to the absolute minimum is the first function of a technical organization, and can be effected by placing manufacturing on a precision basis. Precision is the word that is required in American industry today. Away with rule-of-thumb, hunches, guesses! The gearing of a complicated industry to the manufacture, in millions of pounds annually, of silk that is

uniform in weight, in twist, in diameter, in receptivity to dyes, or the manufacturing of automobiles by the tens of thousands to our high standards of performance, and doing this economically, at a profit, are precision jobs of the highest magnitude.

Testing Department

The method of accomplishing this is through the activities of the testing division of the technical organization. This division acts on the basis of standards of manufacture and product specifications which have been laid down by the development division, and its activities consist in testing raw materials and products in process to see that they conform to the specifications. If they do not, the production department is immediately notified, and its production methods are then jointly examined to ascertain their departure from the norm which is required for a standard product. The supervision of the testing division continues until the manufacture of the product has been completed.

Of necessity, the testing division also has the supervision of measuring instruments, such as thermometers, tachometers, etc., which are used in process control, their care, calibration, and periodic inspection. The job of the testing division can be standardized and established on a routine basis. Men adapted for routine and characterized by personal neatness and accuracy are therefore required.

The second division of the technical organization is the development division. It has for its purpose the application, directly to manufacturing processes, of scientific and technical information. Its function is the study of such processes with a view to modifying them to a definite end; that is, improvement in quality or lowering the cost through existing processes or introducing new ones. This function includes also the introduction into production of entirely new methods for manufacturing new commodities. When such introduction is complete and satisfactory, the process is turned over to the production department.

Thus the development division sets the form which production is to take. All standards, specifications, and methods are laid down by it. The testing division sees that these are maintained.

Research

The third, or research division, of the technical organization has as its scope the pioneering activities of the industry. New ideas must be followed up and developed if the industry is to stand in the forefront of progress. The medium for this is research. Research is difficult to define specifically. It may be described as a search into the unknown. Dealing as it does with the unknown, it is in its very nature highly speculative. Prospecting for gold is akin to research In either case, protracted effort may end in disappointment, waste of money, and failure, or the reward may be a king's ransom. In both cases the percentage of success may be low, but our economic structure rests on a foundation in which both prospecting and research have played a vital part.

Research, as a function of the organization, is a means of putting the manufacturing organization on a footing of greater security. Competition in research is as real a thing today as competition in marketing because, through it, products are being continually developed and improved which immediately outsell older products. The race is on between competitors to prevent the ousting of one's products from market participation, not only by reason of price differentials but because of quality and performance factors as well. In fact, an entire industry may go to the scrap heap as a result of new discoveries or competing industries. Research becomes of paramount importance at such times to point the way to new pathways of manufacturing endeavor.

Intelligent direction of research is a difficult thing. Successful prosecution of research depends on initiative, industry, and imagination, along with technical ability, and relies for its motive force on inspiration. None of these can be directed in the way a production line manufacturing automobiles in managed. Successful research depends primarily on the excellence of the personnel involved and the excellence and sportsmanship displayed in its supervision.

Sales Service

A fourth function of the technical organization is of recent development. It may best be named "sales service." This has the aspect of trouble-shooting when customers have had difficulty with one's products, missionary work with the technical or operating personnel of a prospective buyer, and activities in relation to the technical problems of an outside organization. The personnel required for this work is usually very limited, and should consist of men with decided business instincts.

With this visualization of the function of a technical organization, the lines have been clearly drawn which relate it to the ultimate aim of industry—namely, making a profit. The research division safeguards this by keeping the industry abreast of developments. The development division contributes to it by assuring satisfactory and economic production, both as to methods and products obtained. The testing division keeps production methods and products in the designated channels. It can be readily perceived that this is a decidedly different use of this new tool than the haphazard and ill-directed effort which one sometimes observes.

Regardless of the size of the manufacturing organization or of the technical division, the

(*Continued on page 581*)

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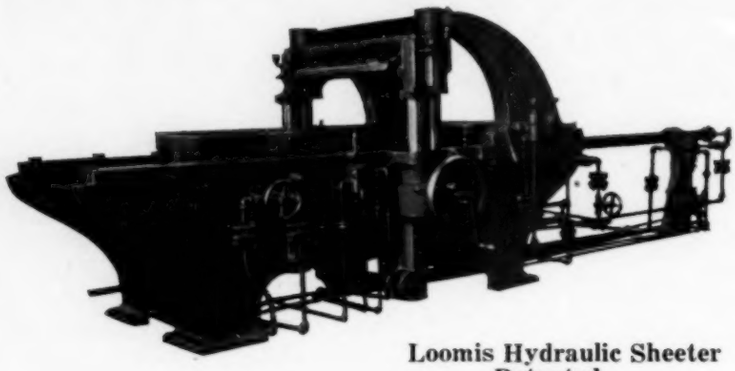

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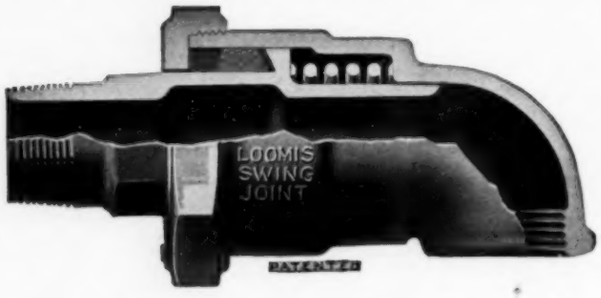

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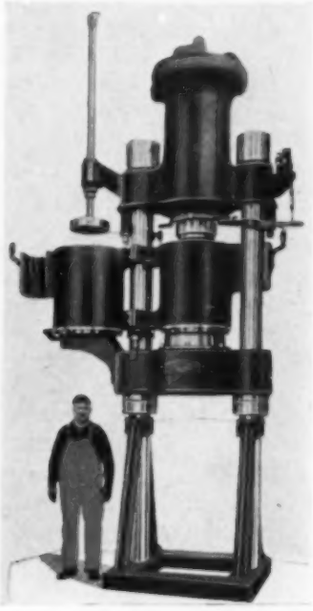

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Pyroxylin as an Imitative Material

How even enamel, cloisonne and moire effects can be obtained. Tinsel, patterned, mottled, amber and tortoiseshell imitations readily made

By Joseph Rossman

SEPTEMBER Plastics brought an interesting and detailed description of how imitation pearl plastics were made.

Imitation Enamel

Patent 1,578,982 Mar. 30, 1926, relates to a decorative material for ornamental panels, plaques, or the like adapted for application to articles of jewelry, clocks, watches, hand-bags, ornamental cases and boxes, brushes, mirrors, toiletware and various other articles having the appearance of enamel ornamentation.

As Applied to a Clock

As shown in Fig. 1, the material consists of a sheet of celluloid or cellulose acetate a having a suitable raised or impressed pattern on one face to which is applied a thin coating b of metal or other suitable material.

Various methods may be employed for impressing the patterns on the back of the sheet, but in practice the method illustrated in Fig. 2 is convenient. The desired pattern is engine-turned, engraved or otherwise cut on one face of a flat plate c of silver or other metal and this plate is employed as one die of a pair between which the celluloid sheet is pressed in a suitable press and at a suitable temperature, the other die d having a smooth polished surface to give a planished surface to the other side of the sheet.

In a common method of manufacturing sheet celluloid the final process is the pressing of the sheet between heated and polished dies, and this process may conveniently be replaced by that described above so that the cost of manufacturing the sheet is not appreciably increased.

FIG. 1

FIG. 2

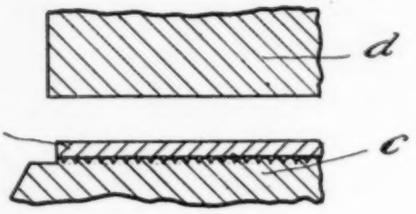


FIG. 3

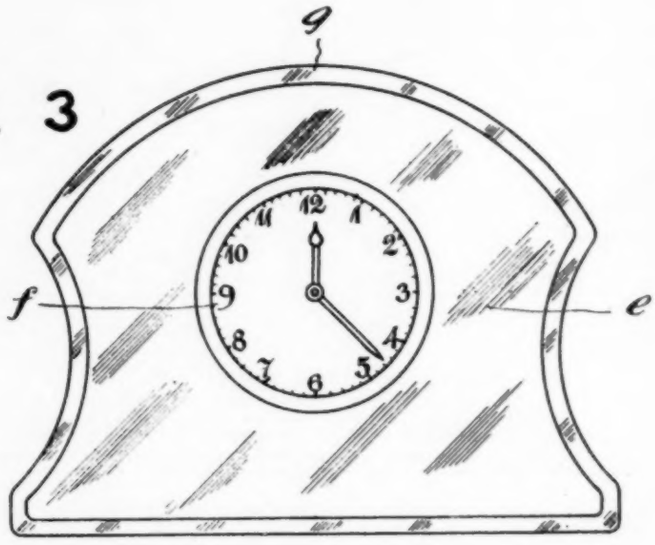
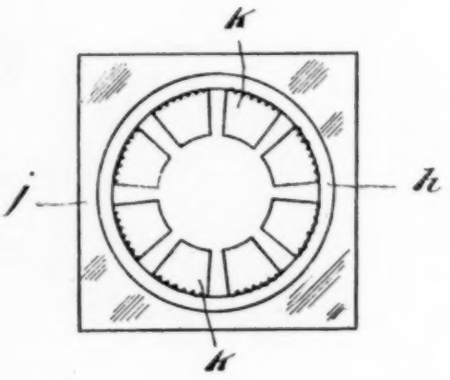


FIG. 4



To get the appearance of enamel and similar ornamental effects, pyroxylin plastics are applied as described in U. S. Patent 1,578,982.

On removing the sheet from the dies the engine-turning will be impressed on one face of the sheet, and this face is then coated with gold, silver, bronze, or other metal by any of the known metal-spraying processes.

In one process which is found satisfactory in practice the metal in finely-divided form is mixed with a lacquer or other suitable liquid and is blown onto the surface by air pressure. The same result may also be obtained by the known process of spraying fused metal upon the surface by air pressure.

Celluloid sheet of any desired color or shade may be employed to imitate enamel of any color and the effect may be varied by employing a sprayed coating of different metals on the back.

Wide Utility

The finished sheets may be employed for a wide variety of purposes which will be apparent to those familiar with the art. For example, they may form panels for the sides of a handbag, fronts for ornamental clocks, linings for cigarette cases, or be inset into the lids and sides of boxes.

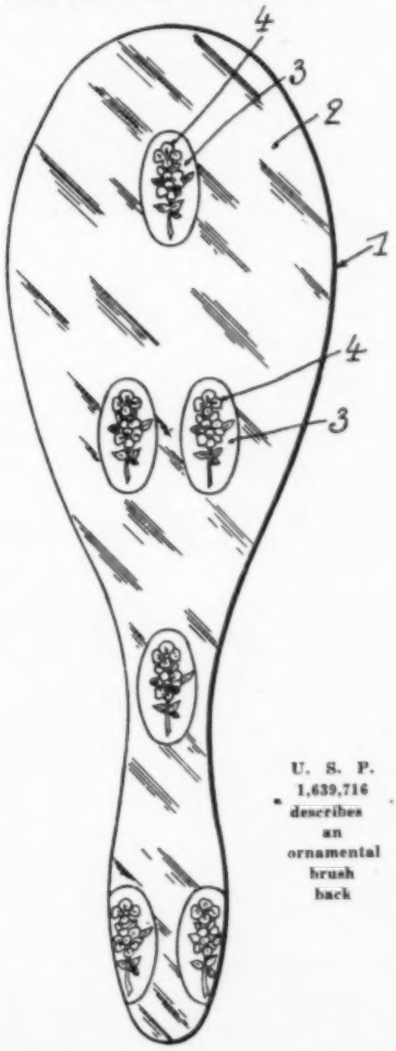
A clock has been illustrated by way of example in Fig. 3 in which the surround e for the clock f is formed from a colored sheet of the improved material coated on its rear surface with silver and enclosed within a suitable silver or other rim g. The appearance of the surround is identical with that of colored enamel on an engine-turned silver plate, and could not be distinguished therefrom except by expert examination.

Where a circular sheet of the material required the engine-turning is preferably of a circular pattern, and where the material is required in tubular form, a pattern may be impressed on the inner surface of the tube in the manner illustrated diagrammatically in Fig. 4.

In this case a tube h of celluloid or cellulose acetate is enclosed with a cylindrical aperture in a block j, the aperture being of such a diameter that the tube may be readily inserted therein.

An expanding mandrel is then inserted into the tube having the periphery of each segment k engraved or engine-turned with a suitable pattern and the mandrel is expanded to impress this pattern on the inner surface of the tube. This inner surface is subsequently coated with metal as described above and the resulting tube has the appearance of an engine-turned or engraved metal tube coated with enamel.

The presence of the metal coating on the back of a sheet of celluloid or cellulose acetate does not impair its flexibility, and where the material is employed for lining cigarette cases or the like it may be moulded to any desired contour by pressing between dies which are warmed to such a temperature as temporarily to render the material plastic, the material regaining its normal elasticity on removed from the dies.



U. S. P. 1,639,716 describes an ornamental brush back

Another Imitation of Enameled Metal

In the process of patent 1,639,716 dated Aug. 23, 1927 the article to be ornamented for instance the back 1 of a hair brush is covered with a sheet of ordinary or crystal glass, mica, galalith, celluloid or like transparent substance. The surface of the sheet which is to be concealed from view in the finished article, is striated or guilloched upon the major part of the surface 2, i. e. a continuous series of regular and relatively minute designs such as those by which guilloched metal is obtained is traced in high or low relief upon the surface, and the patterns employed for such work may be indefinitely varied. Upon one or more parts 3 of the pieces, the transparent substances, which face is to be concealed, when the object is in the finished state, all desired designs for example bunches of flowers 4, as shown, or portraits pictures, artistic or decorative patterns, this reproduction being made by any of the known means of reproduction such as photography, for instance direct photography, upon glass, decalcomania, painting, engraving, photogravure or the like. This reproduction is effected after the face of the piece has been striated or guilloched, but this reproduction can be effected either upon a guilloched or striated portion or preferably upon a smooth portion 3 which has been purposely left untreated during the guilloching operation, as illustrated in the drawing.

The guilloche upon glass, mica, galalith, celluloid or like transparent material may be carried out by any desired means, for instance by the moulding process during the manufacture of the articles, by mechanical engraving, etching or other suitable means.

Inlaying Ornaments

Upon the guilloched face of the object which as above stated is to be concealed from view in the finished piece, several successive coats of dyeing or coating substances are applied for instance:

(a) One or more coats of single or combined colors which impart to the transparent guilloched piece the aspect of a colored substance;

(b) A layer or coating of gold, silver, copper or other metal, in the state of liquid, powder, thin sheet, or in any other suitable state;

(c) One or more coats of a transparent or opaque paint or varnish which serves to protect the first layers or coats.

The object consisting of glass, mica, galalith, celluloid or like transparent substance thus treated will offer when viewed upon the untreated or external face the exact aspect of an object in enamelled metal, thus constituting a new article of manufacture which is adapted for a great variety of uses.

Cloisonne Effects

Cloisonne effects have been produced on celluloid by coloring the surface of a celluloid base which consists in spraying directly thereon a mixture of coloring matter and a celluloid solvent, the spraying being conducted with sufficient force with respect to the thinness of the mixture to cause the coloring matter to be uniformly distributed over the surface of the celluloid, to penetrate it to produce a uniform colored layer. This process appears in patent 1,636,523 dated July 19, 1927 which has been fully given in Plastics, Feb. 1928 page 74.

Moire Effects

The process of patent No. 1,641,629 dated Sept. 13, 1927 is applicable to transparent or translucent sheets, bands or the like of any suitable plastic material capable of being impressed with the line or grid patterns, for instance celluloid or celluloid substitutes, and especially to sheets, bands, etc., of material consisting or having a basis of cellulose acetate, ethyl-, methy- or benzyl-cellulose or other low flammable cellulose derivatives. Such materials as is known usually contain plasticizing or softening agents in their composition.

The lines or grids on the opposite faces of the sheets, bands etc. are generally slightly out of register to produce the interference effect.

The line or grid patterns may be impressed in or upon the faces of sheets, bands, etc. in any suitable or convenient way, for example by closely arranged parallel fine wires, or by means of fine wire gauze, or by means of plates, rollers or other devices engraved, etched or scored with the line or grid pattern, and or in any other suitable way, the degrees of fineness closeness of the lines or grids governing the effect or result obtained. It is understood that the lines may be straight or curved and may or may not form a grid pattern.

Using Wire Gauze

In carrying out the invention there may be employed as impressing means metal sheets or plates covered on one side with tough, finely woven wire gauze, preferably of phosphor bronze, the number of meshes and fineness of wire depending upon the effect desired and governing the result obtained. As an instance only, there may be employed a fine wire gauze of about 140 meshes per inch. Conveniently the gauzes may be soldered or brazed at the ends only to the metal sheets, allowing room for a pad of a number of thicknesses of paper between the gauze and the plate, in order to take up inequalities and distribute heat and pressure in the impressing operation. Or the plates themselves may be ruled by engine dividing or otherwise provided with a slightly incised close line or grid pattern. Or according to another way plates are employed, made by first preparing an impression of the line or grid pattern on gutta percha, rubbing on graphite and electroplating a solid plate on the graphite. Or plates may be prepared by protecting the face of a wire gauze with acid resisting, electrically insulating varnish and then electroplating a solid metal plate at the back of the gauze, the varnish being then removed from the gauze thus united or attached to the metal backing.

The following is one example of the manner in which the invention may be performed in practice. Transparent or translucent sheets of a plastic material such as cellulose acetate or celluloid sheeting, polished or not, are disposed each between two plates prepared in any of the ways before indicated or in any other suitable way for impressing the required line or grid pattern. The pairs of plates with the sheets between are placed in a hydraulic press each between platens provided with steam heating and water cooling means and are subjected at a suitable temperature for instance about 100° C. to pressure, to impress the line or grid pattern in or on the faces of the sheets of plastic material.

The heat and pressure may vary according to the thickness of the material of the sheets. For example for cellulose acetate sheeting or celluloid sheeting about ten thousandths of an inch thick, pressure of about 500 pounds per square inch of the surface of the sheet may be maintained for about two minutes. The platens are then cooled rapidly by a flow of cold water. Cooling takes place under the pressure and the sheets are then removed from the press.

The disposition of the plates fineness of line or grid pattern impressed, and thickness of sheet, produces for each variant a different moire effect.

Tinsel Effects

In carrying out the process of patent 1,506,014 Aug. 26, 1924 the base of the object is worked up in the usual manner from suitable material such as cellulose nitrate to which has been added the pigments necessary to produce the desired color. In the case of the toilet article shown in Fig. 1 the base 10 is kneaded and rolled into a thick sheet. An ivory base also produces a very attractive appearance. This base is formed of superposed adhering lamina-

(*Continued on page 571*)

Some Unusual Applications of Resinoids

Automobile tires, book covers, mats, valves, water-hose and friction drive devices among the ideas patented to various inventors

By Charles W. Rivise

IN the August, 1929 issue there appeared the first part of this review, describing construction materials, desks and tables, artificial honey combs, dash pot casings, battery boxes and the like. Lack of space in the September issue made it impossible to print the continuation of this story.

The author, a patent attorney and former examiner in the United States Patent office, has collected about 1500 American patents on the manufacture and utilization of resinoids. From this collection he has culled some of the uses that are not so generally known, and which may surprise some of our readers.

Automobile Tires

A puncture proof pneumatic tire is disclosed by H. C. Egerton in Patent 1,382,718 dated June 28, 1921. The tire is of rubber and has incorporated therein puncture resisting and strengthening material comprising fabric, heavy canvas, cloth or paper impregnated with Bakelite, Condensite or Redmanol. The puncture resisting material may be in the form of a number of layers of separated disks or other elements interposed between layers of rubber and the disks in adjacent layers may be staggered. They may be in the form of circumferentially or transversely extending laminated strips and metallic reenforcements may be incorporated therein. If desired the puncture resisting elements adjacent the tread surface of the tire may act as supporting elements for hollow or cup shaped gripping elements formed of impregnated canvas or knit cotton fabric such as cotton hose fabric. Additional solid gripping members consisting of sections of impregnated twisted woven or braided cord or rope may also be used. The puncture resisting members may be corrugated or sinuous and may be incorporated into the tread so that the projections extend in proximity to the roadway. Connector elements of frictioned fabric may be interposed between the stiffening elements and the rubber to promote a better bond. The entire assembly is preferably consolidated and cured in one operation.

In Patent 1,484,937 dated February 26, 1924 Egerton suggests making a solid tire utilizing a Bakelite material. Several strips of canvas impregnated with a synthetic resinoid varnish are wrapped about a rim of heavy sheet metal having flanges of the clencher type; one or more impregnated cords are arranged or wound thereon and the rubber tire composition is then molded on. A layer of rubberized heavy open mesh fabric may be interposed between the rubber tire composition and the lower layers. The heat of the molding operation cures the condensation product varnish. The edges of one or more of the strips may be used to reenforce the bead portion of the tire. Securing wires may be used in the body of the tire, in which case they may be arranged on or outside of suitable supporting strips consisting of one or more layers of canvas, cloth or open mesh textured paper impregnated with condensation product.

Egerton's tire patents bring to mind Patent 1,250,959 dated December 25, 1917 in which K. Brown states that anti-skid protuberances on tire treads may be made of a phenolic condensation product to which may be fastened metallic plates. The patentee also proposes to autogenously secure a solid tire tread to a backing of resinoid. The resinoid backing may in turn be fastened to the metallic rim by the means of screws or screw threads.

Besides the automobile tires, bottles, propellers, chemical vessels, chemical apparatus and other articles already mentioned, Egerton has made valuable contributions to the ever expanding field of artificial plastics by suggesting possible methods of making footwear, leggings, firemen's helmets, boots, gas engine distributor casings, switch knobs, valves, battery jars, floor mats, finishing or weather strips, water hose, jack saddles, friction driving devices, extruded articles such as rubber lined or rubber coated insulated tubes, driving and carrier belts, book covers, telephone transmitter buttons, designating badges having distinctively colored numbers, phonograph horns and acoustic diaphrams. Only a few of these many suggested applications can be discussed within the scope of the article.

Book Cover

As disclosed in Patent 1,565,629 dated December 15, 1925, the cover may comprise one or more layers of canvas, paper, cardboard, etc. stiffened and strengthened by being impregnated with Bakelite Varnish. The back may be formed of canvas having folded portions attached to the cover by means of phenolic condensation cementing material. The covers may be made by folding a single sheet of impregnated canvas around one or more intermediate layers of canvas or paper which extend adjacent to the edge of the attaching folds. The entire cover member may be cemented together and molded in shape and may be embossed or ornamented. Reenforcing strips of vulcanized rubber may be attached to the corners or at the inside edge of the cover adjacent the back. A connector strip of frictioned canvas may be inserted between the cover and the rubber to promote the union of the two. Flaps may be provided adjacent the inner edge of the cover to adapt the cover for use as a loose-leaf book. The flaps may be impregnated with a Bakelite Varnish softened by means of aniline or waxy, fatty or oily material such as castor oil. The back may also be impregnated with the same softened composition. In some cases the cover members may be temporarily connected with the flexible back as by sewing or by partially curing the condensation product while leaving one of the cover layers uncured so that it can be bent back for the insertion of the impregnated book tape and the book completed by the usual methods.

Weather or Finishing Strip

Several modifications of a weather or finishing strip are disclosed in Patent 1,352,732, dated Sept. 14, 1920. The essential feature is directed to a strip in which one or more layers of paper or canvas impregnated with cured phenoplastic is used with or without a metallic perforated strip to strengthen the body thereof. A rubber closing edge portion may be secured to the strengthening strips by means of a connector member of fabric which may be provided with a frictioned coating. This is not necessary as when the assembly is heated to vulcanize the rubber and cure the resinoid, rubber is forced into the connector strip. Either the resinoid or the rubber may be suitably colored.

Mat

As disclosed in Patent 1,352,733 dated September 14, 1920 the mat has a contact surface of vulcanized rubber formed with or without projecting contact portions vulcanized directly to, or by means of a sheet of rubberized fabric to a stiffening backing member formed of a plurality of layers of canvas or other fabric preferably of somewhat loose texture carrying and impregnated with phenolic condensation cementing material such as Bakelite, Condensite or Redmanol. Reenforcing members of fibrous material such as cord, rope, or fabric sections carrying cured condensation product may be inserted in the contact portion or projecting portions serving to unite them to both rubber contact portion and reenforced backing. In addition thereto may be incorporated metallic reenforcing members such as metal plates, coiled or other wire strips preferably in association with suitable fibrous material carrying condensation product and having portions projecting toward the contact surface. The backing may be free of condensation product on its under side. The entire assembly may be cured simultaneously to vulcanize the rubber and harden the condensation product.

Valve

The valve member according to Patent 1,352,735 dated Sept. 14, 1920 is made as follows:—

A mixture of short or chopped cotton fiber or thread is mixed with Bakelite, Redmanol or Condensite varnish and molded around a perforated valve plate, after which a vulcanized rubber facing may be secured thereto by means of an interposed connector fabric formed of frictioned cotton duck or heavy knitted fabric. The entire assembly may be cured and united in one molding step. The valve plate may be substantially flat and formed with corrugations, recesses and perforations on its upper surface to which are fastened layers of impregnated layers of cloth or paper preferably of open mesh texture. The bearing member may also be made of impregnated porous or fibrous material.

A gasket, washer or packing member formed of an impregnated stiffening layer and one or more connecting layers may be interposed between the valve casing and bonnet.

Footwear

Egerton has secured about a half dozen patents disclosing methods of making footwear. In Patent 1,352,738 dated Sept. 13, 1920 the patentee describes a shoe, the upper and insole members of which may be made of canvas impregnated with Bakelite, Condensite or Redmanol and the intermediate insole members of canvas, paper, paper pulp, cotton batting or mixtures thereof. The use of cork for its cushioning effect is also proposed. The method of making the article is substantially as follows:—

The upper and insole elements are assembled temporarily connected on a molding last; the assembly is inserted in a mold with a vulcanizable rubber sole and an interposed frictioned fabric connector member and heat and pressure are applied to simultaneously cure the phenol resinoid and vulcanize the rubber.

A method of making a composite fabric suitable for soles, counters or other portions of shoes is disclosed by Egerton in Patent 1,352,739 dated Sept. 14, 1920. Sheets of paper, cloth or wadding are more or less coated or impregnated with a phenoplastic, superposed, partially or totally cured and sheets of absorbent material such as cotton

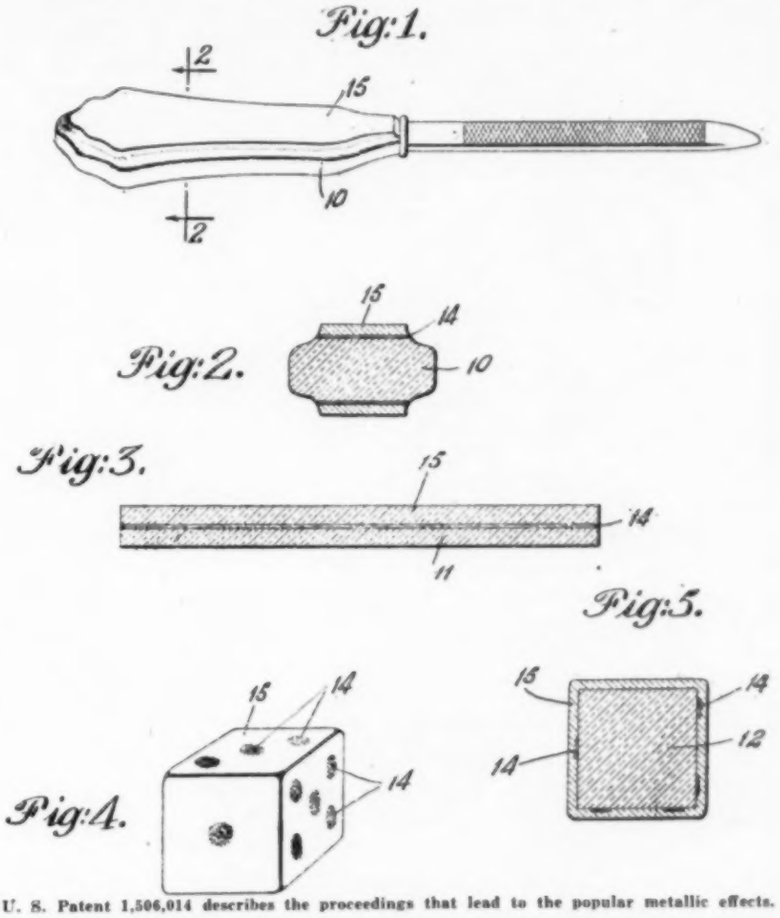
(*Continued on page 580*)

Pyroxylin As Imitative Material

(*Continued from page 568*)

tions, alternate laminations containing a certain amount of white pigment while the remaining laminations contain a somewhat less amount. In the case of the sheet material shown in Fig. 3 the base 11 may be shaved from a block or flowed and evaporated according to well known practice. In the case of the dice shown in Fig. 5 the base 12 may be cut from a block or molded as desired. In the forms shown in Figs. 1, 2, 4 and 5 the base constitutes the body portion or a part of the body portion of the article.

To the whole or part of the surface of the base there is then lightly applied a suitable solvent such as amyl acetate. When the surface has become slightly moistened there is dusted over it silver metallic scale 14 which adheres to the surface or to that part of the surface to which the softening material has been applied. It is not necessary in all cases that the scale be applied so thickly as to form a continuous metallic layer, as excellent effects may be produced when a portion of the background is visible through the scale. The excess solvent which is here being used as a cement is then allowed to evaporate, and there is finally applied to the surface a transparent sheet 15 of cellulosic material of say 50/1000 inch thickness. In case it is desired to produce the effect of silver tinsel this sheet has a trace of blue coloring. If however the effect of gold bronze is desired the sheet is colored with a small amount of amber tint, as previously stated. The amber tint referred to is that of the usual transparent amber, namely, a reddish yellow. One side of this sheet is treated with the solvent cement and after it has become slightly softened the side carrying the cement is pressed against the surface of the base. The sheets thus assembled are placed in a press and allowed to remain until the union is thoroughly effected. The resulting sheet is then removed from the press and cut up into blocks for toilet articles such as brush backs, mirrors, combs, boxes and the like.



U. S. Patent 1,506,014 describes the proceedings that lead to the popular metallic effects.

Pattern Effects

According to patent No. 1,655,677 dated Jan. 10, 1928 knitted, woven or other fabrics composed of yarns or threads consisting of filaments or fibres of cellulose acetate or other cellulose derivatives are employed as a means for producing patterns or effects in or upon the materials, articles or objects. Such fabrics are printed, stencilled, dyed or colored suitably for the pattern or effect to be produced, and are placed in or upon the molding powder and subjected together therewith to the molding under heat and pressure. The fabrics are preferably coated or impregnated with or otherwise contain a plasticizing agent or agents, by preference such as are plasticizing agents for both the basic material of the molding powder and that of the fabric.

In the molding operation the fabric melts or coalesces with the fused mass formed by the molding powder, so that its structure disappears in the molded material or article, while leaving the colored effect, pattern or design therein or thereon.

By this means it has been found that materials, articles or objects can be very reliably produced with patterns, designs or effects of any desired character, while avoiding or greatly reducing the disadvantages previously encountered in the manufac-

(*Continued on page 576*)

Technical Abstract Section

A Concise Review of Patents and Literature

Phenol-acetylene Resin. Howard W. Matheson and Julius A. Nieuwland, assignors to Canadian Electro Products Co., Ltd., Montreal, Quebec, Canada. U. S. P. 1,707,940; Apr. 2, 1929.

Example 1

Two and one-half (2.5) parts of mercurous sulphate and one (1.0) part of sulphuric acid are mixed with one hundred (100) parts of phenol (C_6H_5OH). Dry acetylene gas (C_2H_2) in excess of the combinable amount is passed into the mixture and the temperature maintained between 90°-115° C. The gas is absorbed readliy, the period of reaction being from one to two hours, and a considerable amount of heat being given off. Cooling may be required during the early part of the reaction and warming during the latter part. Approximately fourteen (14.0) parts of acetylene are absorbed and the material formed in the reaction vessel is a heavy liquid which on cooling becomes solid or semi-solid. The material may be now treated for separation of mercury compounds, either by settling, centrifuging, filtration or other suitable means, the material being preferably kept molten during the period of separation. This step, however, is not essential except when the finished product is intended for purposes requiring dielectric strength. Sulphuric anhydride may be used instead of sulphuric acid.

1. A composition of matter comprising a condensation product of acetylene and a phenolic body treated above 100° C. with acetylene and substantially free from uncombined phenolic body.

7. A composition of matter comprising a condensation product of acetylene and a phenolic body combined with hexamethylene tetramine and containing substantially no free phenolic body.

Preparing Coumaron-Idene Resins. Ralph L. Emery, assignor to Neville Chemical Co., of Neville Island, Pa. U. S. P. 1,705,857; Mar. 19, 1929.

1. The method of deriving resin from coal tar distillate which consists in preparing a distillate in which the content of coumaron or of idene or of coumaron and idene amounts to as much as 80% of the whole, polymerizing the prepared distillate with the production of incidental precipitates, diluting the polymerized mass with petroleum benzine in which such precipitates are insoluble, removing such precipitates, and separating the dissolved resin.

Moldable Composition from Scrap Rubber. Herbert A. Winkelmann, assignor to the Philadelphia Rubber Works Co., of Akron, O. U. S. P. 1,709,241; Apr. 16, 1929.

Example 1.—A molding composition embodying the distinctive characteristics of this invention was made by admixing 45 parts by weight of petroleum oil flux (450° F. flash point) with 30 parts of weight of asphalt (softening point 350° F.) These ingredients were heated and thoroughly admixed and 25 parts by weight of vulcanized rubber consisting of ground solid tires were added thereto and the admixture blown until sample test indicates that the admixture has a softening point of 265° F. The blowing operation was then discontinued and the resulting product when cooled was a jet-black, grindable solid, suitable for use directly in the manufacture of molded articles.

Composition of Matter for Battery Boxes. Junjiro Sato and Tsunaji Sato, Jackson, Mich. U. S. P. 1,711,544; May 7, 1929.

Example 1

15 parts gilsonite. 5 parts Korite. 5 parts Parolite.

These substances are melted in three different iron vessels under considerable heat. When freely melted, they are mixed together, and to this mixture we add 1 part powdered elaterite. 23 parts silex or fine pure silica. 27 parts asbestos or asbestos fiber.

The whole mixture is now mixed well while being heated at a high temperature. It is next put into a high grade steel mold having a polished inner surface covered with soft-soap, and the mixture is pressed to proper shape by hydraulic presses in the usual manner.

Molded Gears. William H. Adams, Kenyon, R. I. U. S. P. 1,708,166; Apr. 9, 1929.

The present invention has for its object to provide a novel fibrous blank which may be used for gears or for other articles but which is free from such lines of weakness and which is so constructed that its inherent strength is uniform in every direction with no natural cleavage planes or lines of weakness.

This end is accomplished by forming a blank from hard fibrous threads or cords which are wound or assembled to form a blank or article of the desired shape and with the strands of the cord or thread assembled in layers, each cord having a zig-zag course in its layer and the strands of one layer having a diagonal arrangement with reference to the strands of the adjacent layer.

A blank having this construction and which has been treated with the binding material is free from any natural lines of weakness or planes of cleavage and is equally strong in every direction.

4. A gear blank composed of a mass of synthetic, condensed or polymerized resins containing continuous layers of tensioned fibrous cord, each layer comprising connected parallel turns having a zig-zag arrangement.

6. A gear blank composed of a mass of synthetic, condensed or polymerized resins containing continuous layers of tensioned fibrous cord, each layer formed of parallel turns of cord having a zig-zag arrangement with any portion of each turn extending diagonally of the turns of an adjacent layer with which it contacts.

Machine for Molding Cork Rods. Berthold Nagy, of New York, N. Y. U. S. P. 1,711,962; May 7, 1929.

6. A machine for molding cork rods embodying a horizontally arranged frame, a hopper containing granulated cork and a suitable binder, a supporting member for said hopper, said member having an oil chamber and a registering bore, a plunger rod operating through the chamber and bore, a feed tube fixed to said supporting member and through which the plunger operates, in combination with a mold tube carried on said feed tube and actuated outwardly in step movements on the feed tube by the successive filling charges delivered by the plunger, and means for discharging a filled mold tube and for substituting an empty one therefor.

Fireproof Cellulose Ester Plastic. Rudolph Roland, assignor to Roland Fireproof Celluloid Corp., of Flushing, N. Y. U. S. P. 1,713,482; May 14, 1929.

	Pounds
Acetyl cellulose	25
Alcohol (methyl or ethyl)	25
Chlorbenzol	10
Tetrachlorethane	10
Benzyl benzoate	10
Triacetine	10
Dichlorhydrin	10

The constituents are placed in a suitable container and heated to approximately 75 degrees centigrade and stirred until the acetyl cellulose is dissolved and the mass becomes of a viscous consistency. The viscous mass is subjected to an evaporating process to eliminate an excess of fluid and reduce it to a plastic or workable condition for molding and pressing into the required shape. Pigments or coloring matter of any kind may be added to the viscous or plastic mass according to the desired appearance of the finished article.

Articles formed from the compound or composition are non-inflammable and will retain their elasticity and toughness for an indefinite period. Moreover, sheets of the compound or composition are clear and will not crack or break, hence are admirably adapted for windows in curtains and vehicle tops.

Cellulosic material suitable for esterification. Henry Dreyfus and Clifford Ivan Haney, assignors to Celanese Corporation of America. U. S. P. 1,697,907; January 8, 1929.

Example 1. 100 parts of cellulose dried or containing for instance 5-6% of moisture, are sprayed with about 15 parts of 75-85% formic acid. The cellulose is allowed to stand until the desired degree of reactivity has been reached, for instance for 8-12 hours, and is afterwards added to an acetylating bath.

1. A process for treating cellulosic material which comprises treating said cellulosic material with a small proportion of formic acid, thereby producing a cellulose which is highly reactive for esterification.

Cellulose Aceto Esters Containing Higher Acyl Groups; Cellulose Acetostearate. Hans T. Clarke and Carl J. Malm, assignors to Eastman Kodak Co., Rochester, N. Y. U. S. P. 1,698,048; Jan. 8, 1929.

5 parts by weight of hydrolyzed acetone-soluble cellulose acetate containing about 36.6% of acetyl are added to an esterifying mixture containing 15 parts by weight of stearic acid, 20 parts by weight of chloracetic anrydride, 20 parts by weight of chloroacetic acid, and .05 parts by weight of magnesium perchlorate. The mixture is maintained at 60 to 65° for about four hours, the product being precipitated with agitation into warm methyl alcohol After washing with the latter, the precipitate can be dissolved in acetone, from which solution it yields transparent, flexible films. The precipitate contains about 45.7% of stearyl.

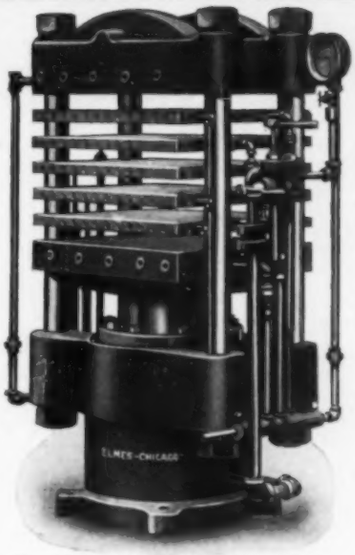
In the last given example, there can be substituted in place of stearic acid an equimolecular proportion of one or more of the following acids,—propionic, n-butyric, iso-butyric, n-valeric, iso-valeric, n-caproic, n-heptylic, caprylic, pelargonic, capric, lauric, myristic, palmitic, crotonic, cyclohexanecarboxylic, benzoic, o-methoxybenzoic, o-chloro-benzoic, acetyl salicylic, phenylacetic, hydrocinnamic, cinnamic.

1. In the process of making cellulosic aceto esters containing higher acyl groups, treating partially deacetylated cellulose acetate with an esterifying mixture which includes an organic acid anhydride of higher molecular weight than acetic anhydride and impels esterification, there being in said mixture a source of said higher acyl groups.

lulose ester containing a brom-substituted stearic acid group, treating cellulosic material in a bath containing brom-substituted stearic acid and chloracetic anhydrid.

Thermoplastic Cellulose Ester Compositions. Canadian Patent 285,-231; Nov. 27, 1928. C. Dreyfus and G. Schneider.

Thermoplastic molding powders are manufactured in the absence of volatile diluents, by grinding 80 lbs. of cellulose acetate in a pebble mill for 6 to 8 hours, adding 24 lbs. of triacetin and 4 lbs. of diethyl phthal-



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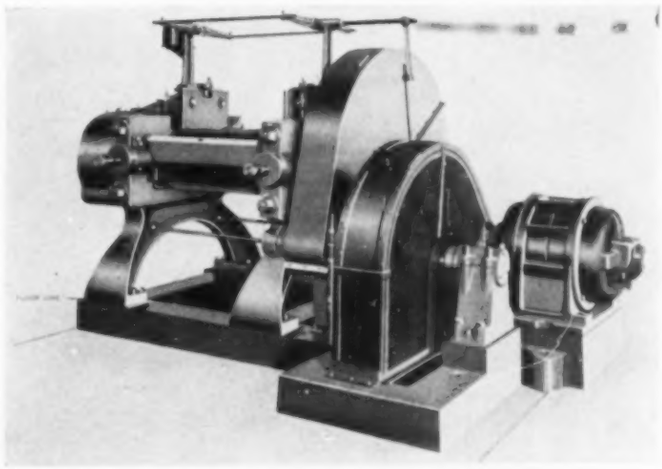

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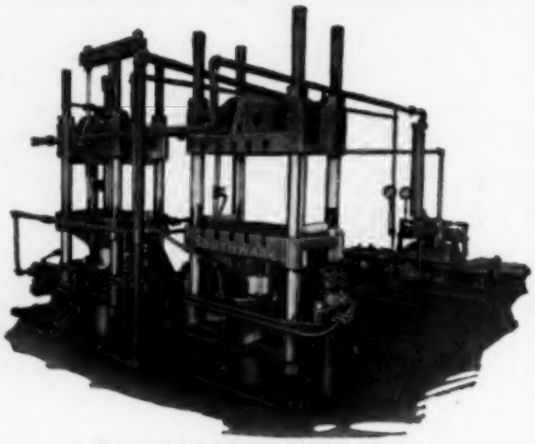

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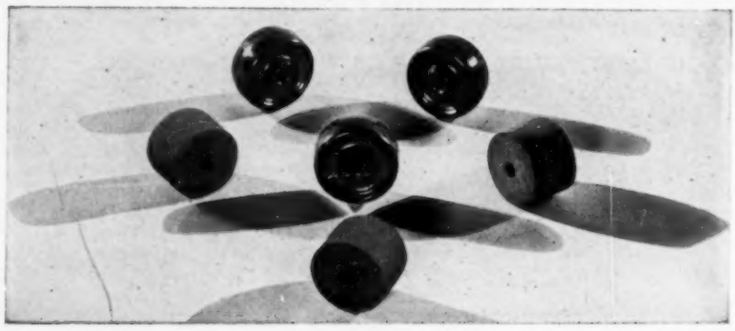
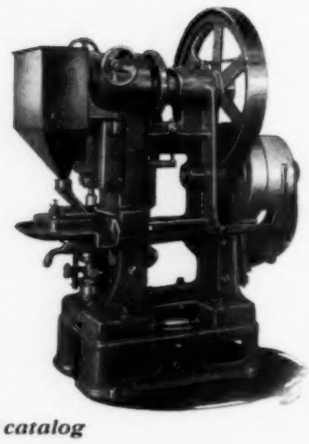


CASTERS for Simmons Beds —preformed on STOKES PRESSES



The illustration shows finished casters for the world-famous Simmons Beds and the preforms—made on Stokes Presses—from which these casters are molded.

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ate and grinding the mixture for an additional 8 hours, then adding 75 lbs, of zinc oxide to the mixture, and further grinding for several hours until a homogeneous mass is obtained.

Casein Solids. Canadian Patent 284,-067; Nov. 20, 1928. K. Ott, H. Schussler, M. Luther and C. Henek.

Casein solids are produced by hardening casein together with dimethylolurea thoroughly under a high pressure at temperatures of about from 80° C. to 120° C. 500 parts of casein and 500 parts of dimethylolurea are thoroughly mixed, and the mixture is subjected to a pressure of 200 atmospheres for 3½ hours in a press, which is maintained at a temperature of 100° C. An artificial mass of yellowish color is obtained.

Phenolic Resins. Canadian Patent 284,773; Nov. 13, 1928. M. Weiler, B. Wenk and H. Stotter.

An aldehyde is treated with a p-halogenated phenol that contains a free ortho position and which may be substituted in the nucleus by indifferent substituents, in the presence of sulphuric acid of a suitable concentration, at temperatures of 15-70° C. and for a time ranging from three hours to three days. For example, 16.3 parts by weight of 2.4-dichlorophenol is dissolved in a mixture of 60 parts of glacial acetic acid and 40 parts of an aqueous 29% formaldehyde are added. After heating several hours to 50 to 70° C. the mass is poured into water and filtered from the precipitate. Unattacked dichlorophenol may be removed by blowing steam through or may be dissolved in sodium hydroxide solution, from which it is precipitated by pouring into dilute acid. The product of condensation is anearly colorless powder easily soluble in alkali and ligroin.

Aminoplastics. Austrian Patent No. 109,532; Nov. 15, 1926. F. Pollak.

Forming article from urea-aldehyde condensation products. Relates particularly to casting.

Cast Aminoplastics. Swiss Patent No. 126,827; Dec. 4, 1920. Societe Anon. pour l'Dinstruie Chemique.

White or ivory-like castings of great strength and high insulating power against heat and electricity and capable of being ground and polished are prepared by pouring a solution of the condensation products of urea and formaldehyde into a mold in the presence of a catalyst, such as sulphuric acid.

Sound Record. British Patent No. 290,801; April 19, 1927. E. Noack.

Material such as artificial phenolic resins or cellulos estetr or ether compositions, after being formed into pressed blocks and ground to a fine powder is freed from all traces of volatile solvent and moisture, mixed with asphalt as a binder, rolled into sheets or strips and molded under heat and pressure. Various other fillers may be added.

Dr. Aladin's Resume of the Resinoid Art will be continued in the November issue because of shortage of space at present.

Urea-Formaldehyde Products Used To Protect Fibers

IN the preparation of urea-formaldehyde resins, the first stage of the condensation gives rise to water-soluble products. Ronald S. Horsfall and Leslie G. Lawrie have now found that these soluble products are capable of protecting wool, silk, fur and similar animal fibers against the deleterious action of alkalies and acids when applied during the washing and dyeing of the fibers.

The products best suited are monomethyl urea, dimethylol urea and the intermediate produced when making resins according to British Patent 213,-567. In their U. S. P. 1,693,926; Dec. 4, 1928, they give several examples; for instance:

Example 1.—Scouring Wool

Unscoured wool is treated for ½ to ¾ hours at 45-50° C. in a bath containing 10 per cent of the weight of material of sodium carbonate and 5 per cent of the weight of material, of dimethylol urea; the wool is then thoroughly washed.

The wool is in this manner sufficiently scoured without having suffered damage, such as tendering or loss of elasticity, due to the injurious action of the alkali.

Example 2.—Dyeing Silk With Vat Colours. (For 20 lbs. of Silk Yarn.)

To the dye bath containing about 50 gallons water are added 3 to 4 pounds caustic soda (76° Tw.), and the temperature is raised to 50° C. when 1 to 2 pounds sodium hydrosulphite powder are stirred in. The dyestuff (10-20 per cent paste) is made into a paste with hot water and added to the dye bath; the whole being stirred well until the colour is dissolved. Finally 1 to 2 pounds of dimethylol urea is added. The silk is entered and worked for ½ to ¾ hour, rinsed and allowed to oxidize.

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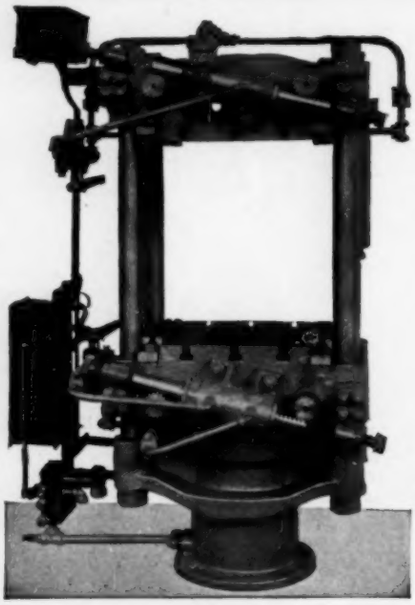

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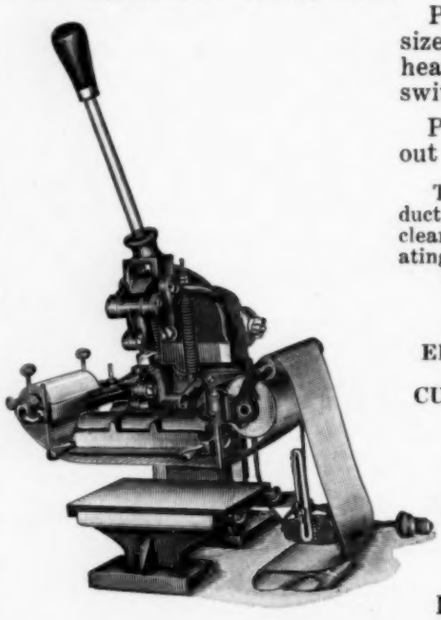

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Pyroxylin For Panels

(*Continued from page 571*)

ture of patterned or effect materials or articles from molding powders such as those referred to. Such difficulties as the liability of the pattern or design to run or blur under the effect of heat and pressure required to cause the molding powder to flow and condense to a homogeneous mass in the molding operation, and the liability to produce too brittle and non-homogeneous products are thus overcome.

Use of Woven Fabrics to Make Panels

In carrying out the invention, the fabric may be employed in a single pieces or in any desired number and arrangement of pieces according to the pattern, design or effect to be produced in the material or article. For instance layers or pieces of the fabric may be disposed alternately with layers of the molding powder, or a single layer or piece of the fabric may be interposed between layers of the molding poyder. Where desired the fabric may be disposed on a layer of the molding powder or be spread with a covering thereof, or any number of pieces of any desired order and position relatively to each other in the the fabric may be arranged in molding powder. Any other appropriate arrangement may be adopted according to the pattern, design or effect desired.

The fabric may be printed, stencilled, dyed or colored in any manner suitable for the production of any desired pattern, design, device or effect. In some cases one may even employ a fabric dyed or printed in a uniform color, so as to produce a corresponding pattern of this color on the material or article on the coalescing of the fabric with the material in the molding operation.

As before stated, the fabric is preferably coated or impreg-

nated with or otherwise contains a plasticizing agent or agents, by preference such as are plasticizing agents for both the basic material of the molding powder and for the material of the fabric. The plasticizing agent or agents are applied in any known or suitable manner to the fabric or to the threads composing it, or a fabric woven, knitted or otherwise formed from threads of filaments of fibres of cellulose acetate or other cellulose derivatives may be employed.

The design, pattern or coloration may be applied to the fabrics in any known or suitable way, for example by printing, stenciling, "spot dyeing", ordinary dyeing or in any other suitable way. The pattern, design or coloration may be applied to the fabric before or after the application thereto of a plasticizing agent or agents as referred to.

Combined Panels Molded

A fabric woven, knitted or otherwise formed from cellulose acetate artificial silk, is soaked in a solution comprising a plasticizing agent dissolved in a substance which is non-solvent toward cellulose acetate, for example a solution comprising 60 parts benzol and 40 parts of a plasticizing agent such as monoalkyl derivative of an aromatic sulfonamide, for instance a xylene monomethyl sulfonamide. The fabric is then dried and the desired design or pattern applied for instance by printing from blocks with solutions of dyes in volatile solvents containing a plasticizing agent. The printed fabric is then dried and cut to desired shape, and inserted in the mold box between layers of molding powder consisting of or comprising cellulose acetate and a plasticizing agent, preferably the same plasticizing agent as that used in the solution for soaking the fabric, the molding powder being preferably employed in a state of fine division.

Any desired number of pieces or layers of fabric may be employed in any required relative

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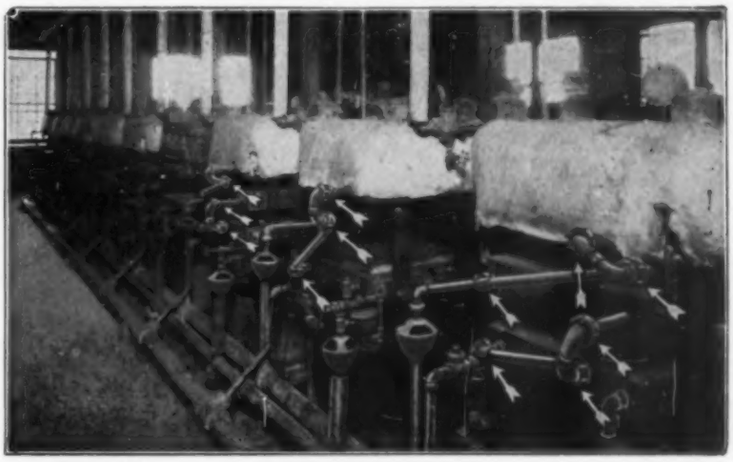

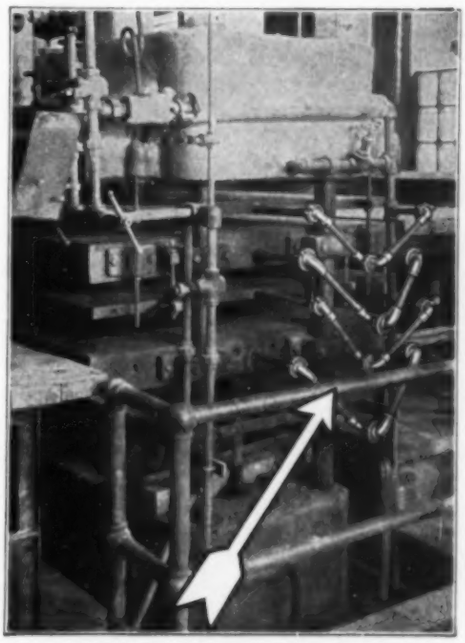

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position according to the type of article and effect it is desired to produce. The whole is then subjected to the necessary application of heat and pressure, for example in a heated hydraulic press, to give a homogeneous product containing the desired pattern. Naturally when a plurality of pieces of fabric are employed they will be inserted in appropriate relation to one another to produce the desired pattern or effect, though it is of course understood that the individual pieces of fabric may or may not each bear the same design or pattern, the design or pattern of the completed pressed article being produced from similarly or dissimilarly printed or colored pieces of fabric placed in any desired relation or register each to the other or others.

Imitation Amber and Tortoise Shell

Imitation amber consists of pyroxylin colored with yellow to brown dyestuffs which are dissolved in alcohol and added to the camphor during the manufacture of the pyroxylin.

Tortoise shell is formed of two colors, one transparent, slightly tinged with yellow, and the other a dark reddish brown, sufficiently translucent to show the color by transmitted light.

The two materials are thoroughly mixed on heated rolls, and then rolled out into rough sheets and cut into small oblong or square pieces. These pieces of the two colors while still warm are mixed together and passed through the rolls which operation forms them into a rough sheet. This sheet is then doubled and repassed through the rolls a sufficient number of times to promote a suitable mixture. The treatment varies according to the effect desired in the final result. When the shell is to be placed into thick sheets, a larger proportion of the transparent material and coarser mixing is required than for thin sheets. When the two colors have received the proper amount of mixing, the sheets thus formed are pressed into a cake and planed into sheets.

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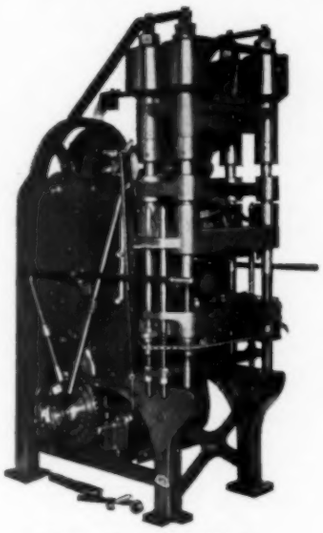

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For a thick sheet of shell pieces 3-16 of an inch thick, about one inch wide, and two or three inches long are used. The cutting of the rough sheet into pieces or strips is done for convenience in mingling the two colors and the result does not depend so much on the size of the pieces or strips as it does upon the skill of the operator.

Another method of forming tortoise shell is performed as follows: the two colors are separately well mixed and roughly formed into sheets about 3-16 of an inch thick. They are then placed in face to face contact and passed between rolls one of which has its surface cut in such a manner the sheets are punctured or pressed into a checkered figure and the line of color upset, one color being forced through the other. The combined sheet thus formed is reversed and passed through again, then doubled, and repassed through the rolls until the desired figure is obtained. The sheet is then smoothed by being passed through a pair of plain rolls and next pressed into a block and planed into sheets in the regular way.

Tortoise shell has been made in the stuffing machine by first mixing the two colors in small pieces and then stuffing them into various forms, such as rods, tubes, etc. The material has also been run from the stuffer in the shape of blocks or slabs from which pieces can be cut, the figure depending upon the angle at which the cut is made in respect to the direction of the grain. It is not necessary that the material be cut into small pieces when run through the stuffer; it is merely necessary that the dark and light parts be in the shape of thin sheets or slices in order to effect a proper mixing of the colors. The process of making imitation tortoise shell was first described in English patent 1739 of 1875.

This story is concluded in the November issue.

Unusual Resinoid Applications

(*Continued from page 570*)

cloth are adhesively secured to one or both sides, the surface of the facing material being left unimpregnated so that it may be attached to articles by means of water, soluble glue or rubber.

Hose

As disclosed by Egerton in Patent 1,352,740 dated Sept. 14, 1920 the hose comprises a plurality of layers of vulcanized rubber which may include a lining and covering layer and one or more interposed layers of fabric or other stiffening members carrying cured Bakelite, Condensite or Redmanol. The stiffening members may be formed of one or more layers of canvas, other woven or braided fabric, cords or ropes. For flexible hose the stiffening members are preferably in the form of encircling rings or strips which may be spirally arranged and staggered in position where several layers of such strips are used. The stiffening members may be reenforced by steel strips and firmly united to the rubbed of the hose by means of interposed frictioned fabric connector elements. The entire assembly may be cured and consolidated at one operation.

Friction Driving Device

The driving device, as disclosed by Egerton in Patent 1,422,550 dated July 11, 1922 has a driving disk mounted on a shaft and formed with suitable aligned openings to facilitate the securing of the facing member thereon. The facing member may comprise one or more layers of fabric such as heavy canvas, other woven or knit fabric, open textured paper or other fibrous material quite thoroughly impregnated with cured phenolic condensation cementing material such as Condensite, Redmanol or Bakelite. The projections to fit within the openings may be molded from additional layers. A rubber facing may be united directly to the impregnated material or by means of a light canvas connector layer, the vulcanizing heat being sufficient to unite the layers and cure the condensation product. Threaded nuts may be incorporated in the facing member to cooperate with bolts passing through the disk.

Phonograph Horn

The horn, as disclosed in Patent 1,475,623 dated November 27, 1923, which is preferably of the flaring flower petal type comprises one or more layers of fabric united by cured Bakelite, Condensite or Redmanol. All the layers may be of knit fabric, the outer layer having an absorbent exposed surface so that

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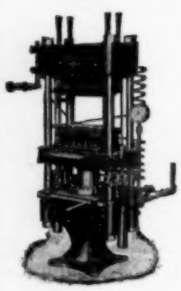

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it may be decorated by a design which may be knit, stencilled or painted therein or which design may be made by superimposing layers of netting, lace or other figured open work fabric of contrasting color. The inner layers may be of pieces of fabric sewed together to form gores or may be made up of strips of cloth or paper wound upon a support and reenforced with knit or braided fabric. The outer layer is preferably unitary.

Several forms of molds for curing the article are described. A rubber or rubberized inner facing may be formed in the article during the molding step, and if desired the rubber facing may be stripped after curing.

The horn may be shaped and partially cured in a mold of simple shape and then reshaped into a more complex shape by molding in a metallic mold immersed in hot paraffin.

(To be continued in November)

Science in Industry

(Concluded from page 562)

functions of this division should be definitely organized according to the fourfold aspect of its relation to the business. Whether the personnel be large or small, its activities can be clearly designated in accordance with functions outlined in the foregoing, the result of which can only be an improved relationship of this important division to the business of making profits.

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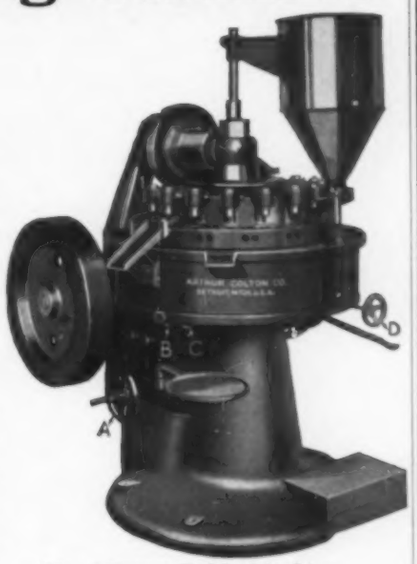

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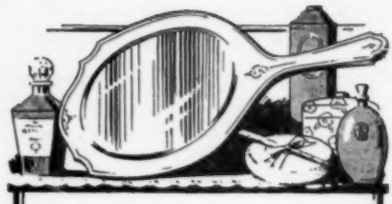

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MOLDED PRODUCTS

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Vol. 3 OCTOBER, 1929 No. 10

Molded Novelties Can Be Sold

With a sound method of distribution one million ash receivers were marketed in eighteen months

By William Gordon

Gordon Manufacturing Co.

THERE is not doubt but that all of us who have brought out new ideas in molded specialties have found ourselves facing the serious problem of distribution when the item was ready for the market. A great many novelties admirably lend themselves to molding in plastics. When we conceive an idea in a specialty, we picture how effective it will look molded in beautiful colors, and think of the tremendous market waiting for such an item. We hold to the idea to the extent of getting quotations, costs of molds, etc. The possibilities of the item loom greater and greater and we finally decide to invest the money in molds and place our order. After a period of trials and tribulations, we finally get production up to the standard we have set, to the mark we had set for it.

After Production Begins Enthusiasm Prevails

The finished products looks even more beautiful than we had visualized it. Then comes the period of preparing display material, circular matter, etc. Everyone we show the item to is greatly enthused and assures us that it will be a great seller. We, in our own mind, never have any doubt about this as everyone will want one. It will be easy to sell to our regular trade,

Mr. William Gordon

department stores, chain stores, novelty trade, gift trade, premium givers, and users of advertising gifts. Our own salesmen assure us that they will sell a million of them as soon as ready and they are all "rarin-to go". After getting out the most elaborate sales helps that we know of, we are now ready to start the machinery of distribution rolling.

We make a list of our best customers, send each a sample with a long personal letter—turn samples over to our salesmen—throw out a few ads here and there in the trade papers—then sit back and await the big rush of orders. Day after day passes by and nothing seems to happen. We wonder why the flow of orders has not started and patiently wait a little longer. We hand out more samples—write more letters—go to see a few more of our "pat" customers and after several weeks of patient waiting we finally come to realize that while the article has all the merits, it is quite a problem to get it into the proper channels. Our regular trade tells us that it is somewhat out of their line. Our salesmen report that they have to see buyers of different departments with whom they are not acquainted—and the jobber tells us that he cannot give an item of this nature the necessary push as he has a big stock of merchandise that his salesmen, as order takers, would prefer to sell, rather than give this special item the necessary time. All in all—we are up against a serious situation.

An Ideal Method of Distribution Must Be Found

But that item can be sold and sold in enormous quantities if the proper method of distribution is adopted. You cannot force the sale of ice on Eskimos. You must find the proper market and adopt another method of distribution for this particular product, the most economical

and profitable to reach the ultimate consumer.

We have found that method for some of our items by direct distribution. What I mean by direct distribution is selling through specialty salesmen who in turn sell the product either direct to the consumer or to the retail dealer. The method depends on the nature of the article. If it is small, compact and popular priced and bears a sufficient margin, we adopt the method of selling to distributors — or agents — as they may be better known to you. These distributors or agents buy outright from us for cash at factory prices and are instructed to sell to the retail merchant at a higher price.

Creating the Distributor

How do we get these distributors? You will notice reproduced here one of our advertisements on the Master Ash Receiver. We run this and similar ads in sales and general magazines to reach agents. As a rule, we have found it most profitable to run full page ads. In a page ad we are able to properly illustrate the item, show its uses, the method of packing and give a brief outline of the market, and profits that the agent can make by handling this item. In most cases we aim the advertisement to bring orders for samples or sample dozens. Sometimes we even incorporate quantity prices to get large orders right from the ad.

The agent clips the coupon and sends an inquiry, or orders a sample dozen or larger quantity from the ad. In response to these coupons we send a letter with a four page broadside, pricelist and a return envelope as well as the merchandise ordered, if any. Our letter as a rule gives a brief description of the item, a summary of the various selling plans and an outline of the profits to be earned and closes by urging the agent to place an order without delay. The broadside is profusely illustrated again with the product, its uses, method of packing and shows the salesman selling this product in actual practice—also the benefits the agent will derive from earning this money, such as owning his own home, driving his own automobile, etc. In preparing the broadside, we work on the assumption that the agent has never sold anything before. We assume that we are sending out a young boy on an errand and must guide him every step of the way.

Needless to say, the majority of those replying to our ads actually go into the business and continue to send fairly large orders right along. This advertisement—while it is addressed to the agent or distributor—naturally attracts others who may be interested in the product. Before a page ad has run its course, we will have received inquiries from every conceivable type and source. Importers, exporters, jobbers, retailers, consumers, chain stores, advertising specialty jobbers, even bankers, brokers and in one case a Senator. Right after the advertisement gets into circulation, things start moving and if proper attention is given to inquiries and the item has merit, you will be sure to do a volume business that cannot be attained thru the regular method of jobber and dealer distribution.

A Costly Method

How does the cost of this distribution compare with that of distributing thru regular channels? My answer is—it doesn't. It will cost you almost twice as much to distribute by this method as it does ordinarily. If you are selling a specialty, however, it should be able to ac-

(*Continued on page 600*)

$60.00 a Day!
with 4 New Amazing Plans and
SUCTION GRIP ASH RECEIVER
Want Money Like This?
"$36.00 in 5 Hours"
"Sold 5 Out of 7"
"Send Two Gross More"
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The type of display advertising, in color, that Gordon Mfg. Co. uses in obtaining the "direct distributor."

Molded Parts Important in New Golf Club Carrier of Novel Design

Chicago Moulded Products Corp. Finds and Overcomes Difficulties in Molding of Don-Bar Golf Club Rack Elements

THE dividing line between "novelty" and "necessity" is oft-times hazy and generally debatable only because of the varying degree of conversatism or far-sightedness of the points of view involved. The phlegmatic old golfer who has been grumbling over his shots for thirty years and who has been poking through an old canvas bag for a like period, would look upon the Don-Bar Golf Club Carrier described here, as a new-fangled contraption that detracts from his pleasure in the game. The man who keeps abreast of modern development in every phase of life's endeavor that tends to make things easier will see in this article something useful and desirable.

Large Sales Appeal

There is no question of the hold that golf has taken on the American public as a form of exercise and recreation. Yet everyone who plays golf must carry his clubs in some form of cylindrical bag in which the clubs are haphazardly stacked, requiring much groping in its gloomy interior to find the required club. These bags are generally lacking in backbone and, unless a caddy is used, must be laid down before each shot is made and picked up again afterwards. Golf balls, must be stowed in the pockets of the old fashioned bag which also proves, on occasion, to be a clumsy receptacle.

In essence, the Don-Bar Golf Club Carrier, which presents such a new departure in appearance and usefulness, consists of two molded members, top and bottom, and two aluminum shafts which are attached to the molded parts on the outer extremities, and hold them club length distance apart. The lower molded piece is made up to include ten tubular projections, eight of which receive the handle ends of the golf clubs, the aluminum shafts being fastened into the outer two. Two molded points upon which the carrier rests when in use, are affixed to this lower piece. The

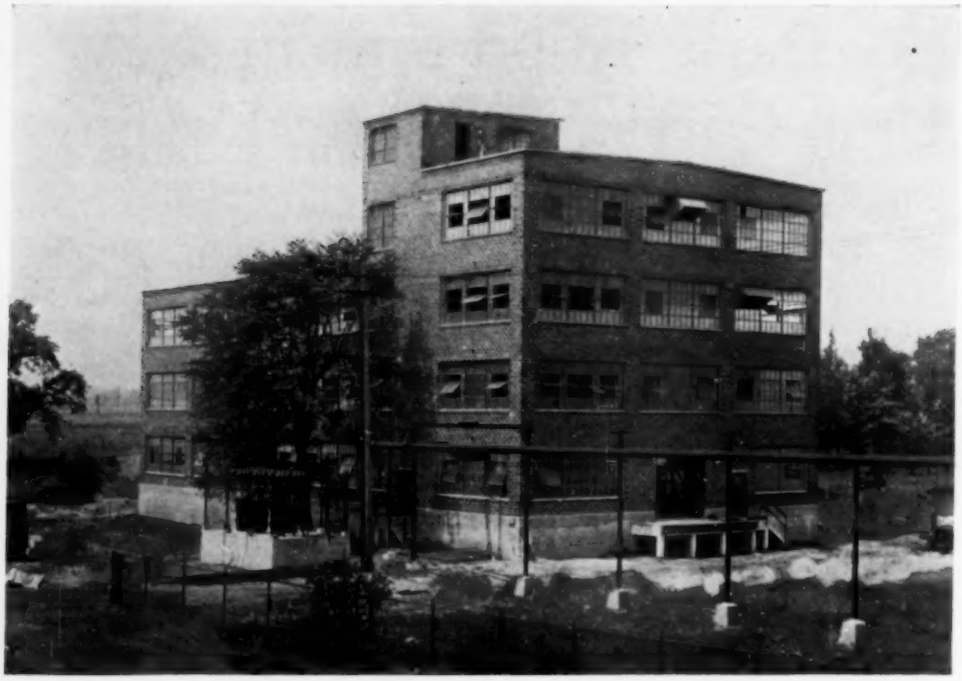
The New Don-Bar Golf Club Carrier

upper molded unit consists actually of two parts, being attached by a hinge arrangement. The principal piece is grooved to receive the head ends of the clubs. Long shanks extend on both ends into which the aluminum shafts are cemented. The hinge arrangement is on one shank and a molded knob and the mechanism for engaging the hinged arm are on the other shank. When the clubs are in the rack and ready for carrying to the next lie, the molded arm is snapped into place. This, with its sponge rubber padding, holds the clubs in the grooves. Metal clips are set into the under side of the top section to which balls may be attached. A swivel arrangement is also inserted to which the third leg is affixed. This makes it possible for the rack to stand erect. The rack may be carried either by the grip handle that is slipped over one of the aluminum shafts or may be slung over the shoulder by the strap which is attached to lugs in the top and bottom molded sections.

Problems in Molding

Several problems were presented to the molder in this instance, The Chicago Moulded Products Corporation, which required considerable study and experimental work before perfection was attained, and production could begin. Most of the strains due to use and handling are absorbed by the molded parts. This necessitated selection of the sturdiest material and so a specially macerated canvas-base molding composition was selected. Color was a consideration too for which effect green Bakelite was scattered through the macerated material at the proper time. In order to insure complete filling at some points, it was found necessary to preform, which also had a bearing on the selection of the material, since this type of molding compound does not ordinarily lend itself to preforming. In fact, such difficulty as far as flow is concerned, was encountered in one of the long projecting sections that it had to be molded separately in order to obtain a good finish. This member was then joined to the main base by shrinking it on immediately after it was removed from the mold. Control

(*Continued on page 599*)



New Plant For Beetle Powder Begins Production at Bound Brook

Synthetic Plastics Co. Starts American Operation After Fifteen Years' Research, Here and Abroad, on Light Colored Molding Powders

THE Synthetic Plastics Company, Inc., subsidiary of American Cyanamid Company, has completed its new factory for the manufacture of Beetle molding powder. This is the new urea-thiourea molding powder which has been described in previous issues of "Plastics," the salient feature of which is its availability in light, translucent colors.

Technical Difficulties Overcome

Numerous attempts to make molding powders of these materials have been made during the past fifteen years, but have been blocked by various practical and technical difficulties, among which has been instability. Inventors have frequently been bitterly disappointed in finding that their molded articles, which were seemingly perfect, would break up in the course of a few months through some obscure continuing chemical action. The praticability of the Beetle formula, however, has been demonstrated by three years' commercial use on a considerable scale in England.

This new American Beetle plant has been built with the cooperation of the British manufacturers and is a radical advance on the British plant. The plant is of steel and concrete, 3 stories high, with a fourth story covering about half the area. Equipment is arranged for opation with the minimum of labor, goods being moved through kettles, mixers and grinders to final containers largely by gravity. Equipment is provided for a large production, and the building will permit the installation of additional units of machinery whereby the production can be doubled at short notice. One feature of the plant is that it can be sealed against the outer air and ventilated with washed and filtered air to exclude dust which might otherwise appear in finished molded articles and show on the white or pale colored surfaces of Beetle moldings. A powerful vacuum cleaning system is used for keeping the plant immaculate and to prevent mixing of colors. The operating units are numerous, so that the colors which are most in demand may be run continuously in single mixers and grinders, without the necessity for washing up for a change of color.

Equipped for Large Capacity

Figures of the capacity of the plant are not made available by the Company, but the plans have been made in the conviction that out of the great annual tonnage of molding powders now being used in the United States, an important fraction will be in the light, translucent colors which Beetle now makes possible, in addition to which it is believed that the coming of these colors will lead to important exten-

sions of the molding powder field to areas in which the opaque and darker colors of the phenolic compounds were not wholly satisfactory. Beetle is free of tastes and odors, a fact which further broadens the opportunity into new territory.

The Cyanamid Company is strongly fortified in the matter of raw materials, being sole American agent for the manufacturers of one ingredient made as a by-product by the British owners of Beetle, and being in a position to make the major ingredients from the Cyanamid which it is producing at Niagara at the rate of 350,000 tons a year.

Being Molded for Two Years

Beetle has been accepted after elaborate tests by a number of leading users of plastics, and four custom molders have been instructed in the art of molding Beetle, namely: Kurz-Kasch Company, Colt's Patent Fire Arms Manufacturing Company, Northern Industrial Chemical Company, and American Insulating Corporation.

The Kurz-Kasch Company, at Dayton, Ohio, have been molding with powder imported from England for two years, in a small way hampered by the high cost of the British product, on which a heavy duty was levied. Numerous attractive articles have been produced in the Kurz-Kasch plant, nevertheless, for sale by Marshall Field for table ware purposes, including coffee cups, tea sets, fruit bowls, compotes, bath-room tumblers, etc. In addition, Kurz-Kasch are molding a rapidly increasing line of radio, electric and automobile parts in Beetle.

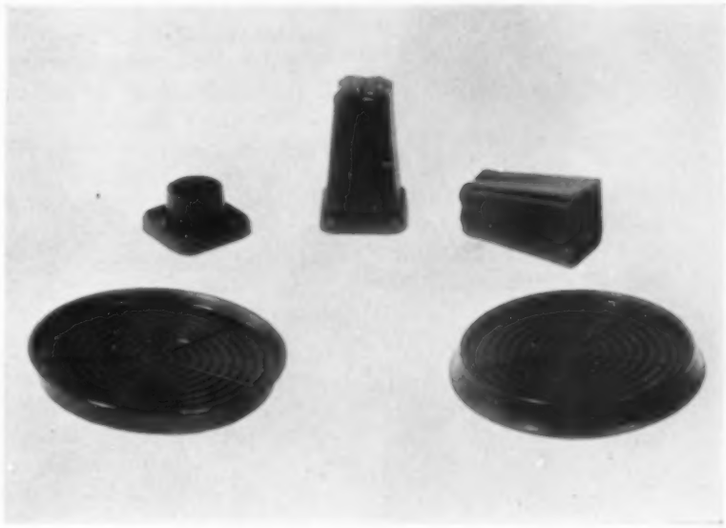
Sales and Service Staffs Organized

The sales work of the four custom molders is supplemented by a staff of three field men of the Synthetic Plastics Company, covering commercial users and possible new users of such plastics to develop leads which can be turned over to the custom molders for quotations. They are under the supervision of K. N. Atwater, sales manager of the Synthetic Plastics Company, with office and display room at 535 Fifth Avenue, New York. The President of the Company is Richard S. Childs, who is also Assistant to the President of the American Cyanamid Company.

The American Cyanamid Company's research organization has been at work for ten months learning the British experience in England and adapting it to American conditions and materials.

A control laboratory is provided in the new plant, but the research work will continue to be done at the American Cyanamid Company's large laboratory at Warners, N. J., under the guidance of G. H. Buchanan, chief technologist of the American Cyanamid Company; and Dr. George Barsky, chief of the research division. The Company has appropriated $50,000 to continue research in this field, and many fascinating ramifications have been disclosed of which announcement at this time would be premature.

The new plant began operations on a full scale in August. It is located at Bound Brook, N. J. in the grounds of the Calco Chemical Company, another subsidiary of the American Cyanamid Company.



Two Norloc Novelties Molded in Bright Attractive Colors

DESPITE the passing of summer and with it a round of picnic lunches and porch bridge parties, the hostess will find these Norloc Coaster and Salt and Pepper sets an attractive adjunct to her service at the informal afternoon gathering. If anything, bridge parties are on the increase, rather than otherwise, in the fall and winter months, sandwiches and drinks being the customary refreshment. The molded coaster is just the thing upon which to set a tall thin glass without danger of spotting the cloth or affecting the top of the bridge table. The colors of the salt and pepper shaker pep up the jaded appetite almost as well as their contents.

These novelties are made by the Norton Laboratories at Lockport, New York in bright Durez colors; scarlet, green and terra cotta and are attractively packed in sets of six coasters, two salts and two peppers. Coasters are reversible to take care of different sized glasses and have the advantage of staying on the table and not sticking to the glass.

Simplified Design, Mass Production and Ideal Surface In Dan-D-Fold Dispenser

Molded Bakelite Replaces Lacquered Metal Cafeteria Fixture Yielding a Fine Looking Job With Fewer Steps in Production

New material for an old use might be the title of this story which really pertains to the art of gentle eating. Manifold modern improvement is involved in the Dan-D-Fold napkin dispenser, a device put out by the Daniels Manufacturing Company, Rhinelander, Wisconsin. This patented cabinet is designed to dispense paper napkins in restaurants, cafeterias, tearooms, etc. Bakelite material has been chosen for the construction, and hence there is eliminated the unsightly appearance of a tarnished metal holder. By the same token, there is a conspicuous saving in labor because polishing is no longer necessary. Furnished in plain or vivid colors, the case is produced with a surface finish which might be described as integral. In other words, there is no lacquer surface to wear off. Since the material is not metallic, but organic, tarnishing or corrosion can not occur.

A Single Unit Box

This cabinet, which is the acme of simplicity, is a rectangular box-like affair about 8″ high, and 4½″ sq. at the base. Ample apertures 2½″ by 5″ permit the easy extraction of napkins, yet provide for perfect retention of the main supply. There being two apertures, the device is equally convenient to the diner on either side of the table. From a technical standpoint, there are interesting features, all of which have to do with inherent simplicity and fundamentally sound engineering involved in the design and construction of the box. In one sense, we might say that the Bakelite case is the whole works, and on the other hand, we can say that the device involves no works—in the ordinary mechanism sense—to get out of order. The case has a partition in the center which serves to divide the double stock of napkins and to support a "Y" shaped spring metal clip which holds the napkins constantly ready for extraction. A weighted metal base serves as closure and mounting for the cabinet.

In line with present day interest in new materials, and their influence on commodity design, we note the relative simplicity of Dan-D-Fold as constructed of Bakelite material, in comparison to the complications involved if it were to be made from metal. To begin with, if metal were employed one or more sheets would need to be formed and joined. If silver were used, certain hand craftsmanship might be requisite in addition to final operations of polishing or buffing. If the device were to be made from one of the commoner metals, a process of enamelling or lacquering would have to be employed to produce the present color effects. Even at that, it would be doubtful if the finished product could be made as attractive in appearance as are the present reproductions of walnut or mahogany.

Metal Inserts Fixed In Mold

Comparison of the technique of producing such a device from metal, and from resinoid material, shows the relative adaptability to mass production. With resinoid material it is possible to make one or more Dan-D-Folds at every closing of an hydraulic press. When discharged from the press the part is complete in every detail. It has, firmly incorporated, three metal inserts which engage with the base to hold it in place. There is also a groove to hold the spring metal napkin clip, and on two sides of the exterior is embossed lettering announcing the product trade-name and manufacturer. The surface color, texture, and lustre is complete and final. There is no further operation of sanding, lacquering, or buffing required.

Resinoids in the Textile Industries

Bakelite Molded and Laminated Replace Many Materials Where Durability and Chemical Resistance Are Essential

By Leon V. Quigley, Technical Editor, Bakelite Corp., and C. Robert Given

MANY baffling problems in production have been solved for various industries by the application, in one form or another, of the synthetic resin materials. In the relatively few years since the invention of the Bakelite resinous materials by Dr. L. H. Baekeland, these have assumed a position of importance in the industrial picture. Not the least significant beneficiary in the roll are the rayon and textile industries, in which numerous applications of Bakelite in the lacquer, enamel, laminated stock, and powder-molded form have been utilized.

The Spinning "Bucket" of Rayon

The visitor to a rayon factory finds row on row of black and brown spinning pots—or "buckets", to give them their trade description—whirling rapidly, while "new-born" yarn filaments are fed down to them from above. Their function is to spin, collect, and somewhat dry the rayon. A number of fine rayon filaments are fed vertically into the rapidly revolving buckets, and the rotary motion serves to twist or spin them into a yarn which then collects in a ring-shaped or annular cake.

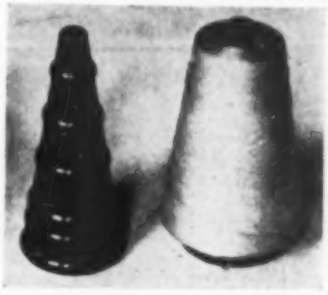
The "Bucket is used in manufacturing rayon

Let us look for a moment at the construction of these buckets. A typical example is seven inches in diameter and four inches deep, cylindrical in shape, with a well thickness of about five-eighths of an inch. In the usual construction there is a small cylindrical sub-base, two inches in diameter, permitting connection to the vertical driving spindle by means of a bronze bushing.

Bakelite Replacement of Metal Rubber Construction

Originally, rayon spinning buckets were made of aluminum, coated with a hard-rubber surface to better protect the metal from the chemicals encountered. It was found that the residual sulphuric acid rapidly attacked the rubber as well as the aluminum, necessitating replacement after a few months' use. In addition, as the rubber disintegrated, finely divided particles of rubber were introduced as impurities in the rayon. The manufacture of the bucket from other metals was then considered, only to be abandoned because of their greater weight and general susceptibility to chemical attack. Possibilities of an experiment with Bakelite molded resinoid material were pointed out. Chemically inert, it should give satisfactory service for a longer period than could be expected from the aluminum-rubber unit.

There were, of course, numerous other factors to be considered. For instance, the material must impart no color to the rayon being spun. Moreover, it must be mechanically strong and dimensionally true, or the rotational speed, coupled with lack of symmetry, would soon set up destructive vibration. Trial was made, and the experimental adoption became a standard.



The cone has been successful in the spinning of silk.

Bakelite Molding Technique and the Spinning Bucket.

Spinning buckets are molded on hydraulic presses. A highly polished steel die, conforming exactly to the pattern of the finished bucket and consisting of two principal parts, which we may refer to as the cavity section and the plunger, is loaded with the molding material. The press is then closed. The action of the heat causes the resin binder in the molding material to flux and flow throughout the mold and after a few more seconds the mass begins to solidify. The chemistry of this reaction is rather complex, but briefly it can be said that the whole operation merely amounts to charging a carefully made steel mold with a proper quantity of fine dry, molding material, this material subsequently setting, then congealing under heat. In a very few minutes the process is completed, the die opened, and the part discharged. The part as it comes from the mold is complete in every detail, and

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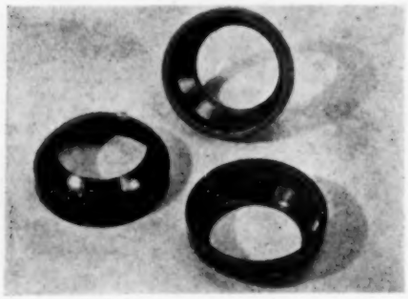
contains high surface lustre. The material of which it is made has a combination of properties found in no other single substance. Having thus been created, it will never melt again under heat although it will char at high temperatures. Originally it could be dissolved in the common solvents but when set it cannot. At first the resinoid could be broken easily; whereas when finished it is strong and durable.

The application of this simple molding process, by which the synthetic phenol resinoid materials are being adapted to every important industry, is as varied as it is interesting. The manufacture of radio dials, washing machine impellors, electrical instrument cases, clock cases, insulators, and automobile ignition distributor heads involves much the same technique as is found in the creation of the rayon spinning bucket.



Cone tips of molded resinoid are less brittle than porcelain and prevent snagging the yarn

Steaming Bobbins

Both laminated Bakelite sheets and tubes, and Bakelite molded are now available in steaming bobbins, replacing those of wood or metal. The laminated stock is used in making spool heads and barrels. Here, the bobbins are built up in a fashion similar to those of wood or metal. Manufacture of the molded bobbin is similar to that of the spinning bucket. Usually, the head and part of the barrel are molded in an integral piece.

The use of either type of Bakelite material affords several advantages in bobbin-making. Those of uniformity of weight and size, and lack of water absorption or change under atmospheric conditions are at once apparent. The Bakelite bobbin does not retain tints from one run of silk to discolor subsequent runs; it does not splinter; nor do gudgeons loosen. Its barrels withstand cutting of selvage yarn better than wood, which scores easily, and thus requires refinishing. It offers greater wear resistance in spindle holes, and it allows possibilities of change in bobbin weight by use of a heavy gudgeon on the spinner and a light gudgeon on the corner.

Loom Pickers

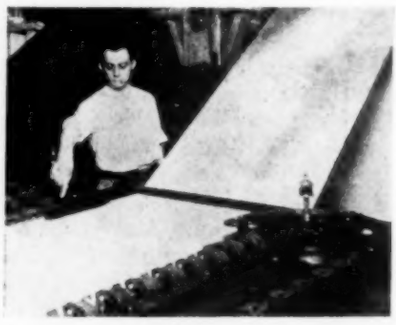
One manufacturer has recently completed a line of some twenty styles of loom pickers, molded from a shock resistant type of Bakelite. When properly adjusted, these pickers have three to four times the life of a rawhide picker.

Related Applications in Textile Field

The application of Bakelite materials thus far in the fields of rayon, silk, and in the general textile industry has been limited to a few major lines. In some factories it has been found that knitting cones made of molded resinoid material are decidedly superior to wood. They do not become rough, and losses through retention of yarn on rough surfaces are eliminated. An improved top for cones has been adopted in several leading hosiery mills. This Bakelite top is less liable to break than porcelain. It prevents snagging the yarn as it leaves the cone, and thus short ends leave the cone with absolute smoothness, down to almost the last yard. Laminated gears have, during the past ten years, been used in many points in textile plants, usually on the drives of electric motors. Their installation on a felt-sizing machine is indicative of the varied uses of Bakelite gears in textile and related industries. These gears alternate between the metal units and serve to eliminate corrosion which resulted from galvanic action when an all-metal gear train was used.

Numerous other textile applications have been under consideration, but in certain of these, although the properties of the material have been proved highly satisfactory for the purpose, the total number of units required of any particular item would not justify production cost. It should be remembered that in the production of molded parts a large proportion of the initial cost is occasioned by the necessity of building a steel die. To justify this expense, production should be in thousands rather than in hundreds. Lack of past standardization has accounted for a wide range of design in textile equipment. Thus, even in the largest plants the annual consumption of any particular item among numerous accessories has been limited to a few hundred pieces. With an increase in simplification and standardization, this situation is being changed.

There are, of course, many minor uses of laminated and molded materials in the rayon



Bakelite laminated blant openers are used on cloth tentering machines. The laminated material is made from fabric layers impregnated with Phenol Resinoid

and textile fields which have not been referred to. An effort has been made to present a picture of the important general applications of these materials. The resinoid materials have justified their use thus far by solving a large number of technical problems in equipment design. In many instances they have replaced the natural materials such as stone, wood, and metal, where these have been found less desirable.

Notes On a Survey of The Indian Mica Market

By A. C. Blackall
British Correspondent of Plastics

NOW that Mica is so largely competing with the Plastic industry a few particulars on the marketing problems should prove of special interest. It is known that approximately 70 per cent of the world's supply of mica, the important raw material used for insulation purposes, is obtained from British Empire sources, with India by far the largest contributor. The two most important mica markets in the world are London and New York, and the great bulk of the material sold in these centers is marketed through brokers.

While on study leave some time ago, G. Vernon Hobson, Assistant Superintendent of the Geological Survey of India, made inquiries both in Great Britain and America into the utilization of mica and the special problems relating to its marketing. His report is published as No. 40 of the Bulletin of Indian Industries and Labor.

Middleman Seems Fixed

He sought, for instance, to appraise the value of the services rendered by the brokers. His conclusion is that, while the price increase between the producer and the consumer does not appear to be justified by the service rendered, and is probably only made possible by close working agreement between the limited number of brokers concerned, the entire elimination of the middleman would be, in the present state of trade, a matter of considerable difficulty.

The broker serves a useful purpose as a sort of clearing house. He is prepared to purchase all sorts and classes of mica, more or less in any quantity, and he carries stocks from which a customer can receive prompt delivery in ordinary cases. His expert technical knowledge concerning different types of mica from various localities and the sizing and grading of mica is also of value to those consumers whose purchase of mica consists of so small a fraction of their business that it would not pay them to maintain a mica expert on their staff. By dealing with a local broker considerable time is saved in negotiations, and settlements of disputes are greatly facilitated.

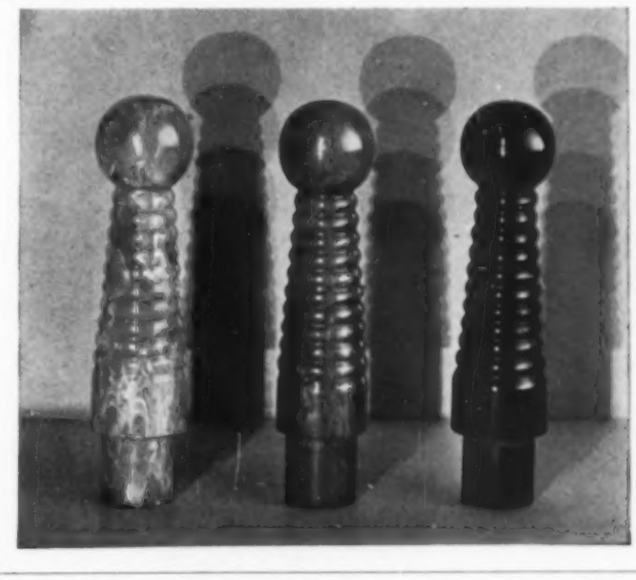
For the elimination of the middleman some drastic change in the whole system of marketing would be needed, and particularly a plan of cooperative marketing by the producers, with local representatives in the larger consuming countries. Mr. Hobson sees that so far as producers in India are concerned a great change of heart would have to take place before such a scheme of cooperative marketing could be brought into being. The elimination of distrust of each other among producers and the growth of a spirit of mutual help should open the door to distinct possibilities of success in attempting cooperative marketing.

Mr. Hobson thinks it reasonably certain that the markets for mica will steadily increase, and that the demand for slittings will increase at the expense, to some extent, of that for mica blocks. The Indian position in the market is still of great strength the greater demand for splittings contributing materially to this. The demand frequently made by consumers for Indian mica only is often based not on any intrinsic superiority of the Indian product, but on its more satisfactory grading and marketing. Other countries, however, are now alive to these facts, and Mr. Hobson warns the Indian producer not to relax his efforts because of the commanding hold India has on the market. He should by constant effort improve the condition in which his product is marketed, so as to offset the growing competition from other countries.

Methods Lack Strength

The need for immediate steps to be taken, by the proper authority to ensure protection against illegitimate trading is urged. Thereby feelings of

(*Continued on page 598*)



Aeroplane Control Stick Handles machined from richly colored Bakelite resinoid, are, unlike metal handles, easy to grasp and comfortable to hold regardless of the temperature extremes at various altitudes.

NEWS *of the* INDUSTRY

Du Pont Viscoloid Adds Million Dollar Plant at Leominster

The Du Pont Viscoloid Company will begin construction within the next few weeks of an addition to its Leominster plant, for the manufacture of transparent Pyralin sheeting for use in safety glass.

New buildings will be constructed and equipped with specially designed modern machinery for the production of the superior quality required by the safety glass industry. This new machinery has been designed by du Pont engineers after thorough study, and will produce the special grade of sheets in sizes which have not heretofore been made in commercial production.

The additional installation, which is estimated to cost approximately $1,000,000, will be completed in the summer of 1930, at which time the facilities of the two Du Pont Viscoloid Company plants at Arlington, N. J., and Leominster, Mass., will be adequate to serve the growing needs of the safety glass industry.

The new facilities assuring an ample supply of transparent sheeting of the highest grade, will doubtless contribute greatly to the rapid and widespread adoption of safety glass, which has already become well established in public favor.

With the new addition, the Leominister plant will have complete and modern equipment for the production of all types of sheets, rods and tubes, supplementing the large production of toys, novelties, combs, hair ornaments, tooth brushes, etc., which are already being produced upon a large scale.

Special Notice

AS this issue of Plastics goes to press the National Electrical Manufacturers Association announces that the Molded Insulation Section will hold a trade practice conference before the Federal Trade Commission during the annual meeting of the Association at Washington the week of October 7. at the Wardman Park Hotel. This conference and seven others have been definitely scheduled for Thursday, October 10.

Alcorn Resigns From Celluloid Corp.

Mr. T. E. Alcorn resigns from his position of Assistant Technical Director of the Celluloid Corporation on September 20th to take a position with the McGraw Hill Publishing Company.

Mr. Alcorn has been associated with the Celluloid Corporation for the past nine years in the capacity of Superintendent of manufacture of pyroxylin and as Assistant Technical Director. In his work with the company he had become recognized as one of the foremost men on nitration in the industry.

His duties will be taken up by Mr. B. Andersen who has been in the employ of the company for the past two years.

NEWS

W. S. LANDES, Vice-president and Works Manager of the Celluloid Corporation was presented with the Distinguished Service Medal by Governor Larson of New Jersey at the summer encampment of the 113th Regiment at Sea Girt. Mr. Landes has already been decorated with the Distinguished Service Cross, the Croix de Guerre and the Chevalier's Cross of the French Legion of Honor for conspicuous conduct in the Great War.

Gering Scrap Plant Destroyed By Fire and Explosion

THE pyroxylin plastic reclaiming plant of Larry Gering, Inc., Parkhurst Street, Newark, N. J., was destroyed by fire on September 19th. According to reports, damage amounted to $25,000. At the time of going to press, the cause of the fire was unknown.

MAKALOT EXPANDS

The Makalot Corporation, manufacturers of the molding powder of that name, have acquired a new plant in Waltham, Mass., which is being equipped for production to begin October 1st. This expansion was caused by insufficient facilities at the Everett plant, the present tract comprising two acres with adequate railroad siding facilities. At first, thirty men are to be employed. Madison M. Makeever continues as president of the company.

ALFRED HARRIS, of London, England, is in this country making a study of conditions in the industry, his headquarters being at the office of his American representative, Irving L. Goldberg, Inc., 271 Madison Avenue, New York City.

Changes in Du Pont Sales Organization

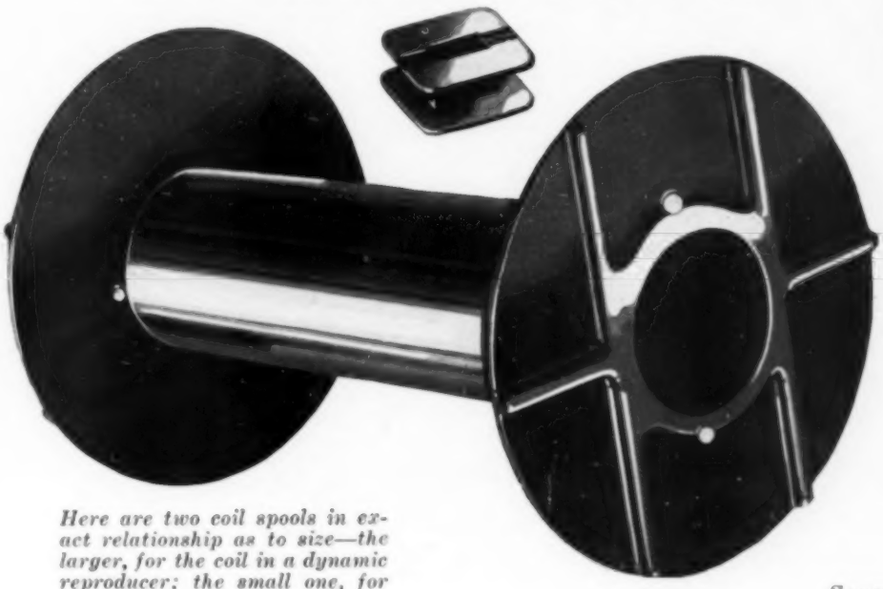
Organization changes in the Du Pont Viscoloid Company, announced to take effect at once, are as follows:

J. F. O'Shaughnessy, Director of Sales, resigns, effective September 15, to accept an executive position in the Tire Division, United States Rubber Company.

SCRANTON

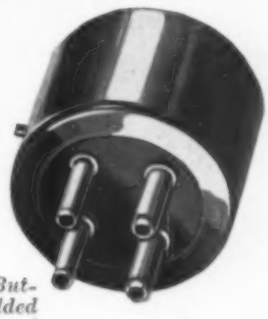
The world's largest and newest-equipped moulding plants

We Invite You to Our Exhibit at the
EIGHTH ANNUAL CHICAGO RADIO SHOW
October 21st—28th Booth 25-Sec. HH



Here are two coil spools in exact relationship as to size—the larger, for the coil in a dynamic reproducer; the small one, for a phonograph pick-up.

This is a moulding for the new "Clarostat" wire-wound volume control.



Scranton Button has moulded MILLIONS of these new type tube bases.

Moulding **for the Radio Industry since its beginning,** it was only natural that pioneer radio manufacturers came to Scranton Button for moulded products since Scranton Button's long experience in moulding for all industries dispelled any doubts as to results. Many of those pioneers' names are paramount in radio today—most of them still depend on Scranton Button accuracy and beauty attained in mouldings of LACANITE, BAKELITE and PHENOLIC.

THE SCRANTON BUTTON COMPANY

Plants at SCRANTON, PA. and AUBURN, N. Y.

NEW YORK, N. Y. 50 Union Square
DETROIT, MICH. 114 East Lawn Ave.
CLEVELAND, O. 4900 Euclid Bldg.
AUBURN, N. Y. 40 Washington St.
SCRANTON, PA. 419 Cherry St.
CHICAGO. ILL. 645 Washington Bld.

The two knobs shown here are fine examples of today's trend in radio architecture. Natural wood effects obtained to match cabinets.

When writing The Scranton Button Company, please mention *Plastics*

PLASTIC
MOLDING

Producers of the finest
in Molded Parts for
thirty-seven years

Shaw Insulator Co.
Irvington, N. J.

SHAW

When writing Shaw Insulator Co., please mention *Plastics*

C. F. Brown, General Manager, will function as Director of Sales until November 1.

W. D. Ward, District Manager San Francisco, is appointed Director of Sales, effective November 1.

R. H. Diehm, Salesman, is appointed District Manager San Francisco, effective November 1. He will report to Mr. Ward in San Francisco, October 1.

Mark Cleaver will take over Mr. Diehm's territory (Illinois excluding Chicago, Wisconsin, Minnesota, Iowa, Nebraska, Colorado, as of October 1.

R. A. Wait, District Manager Chicago, is transferred as District Manager New York, effective January 1.

W. A. P. Miller, District Manager New York, is transferred to District Manager Chicago, effective January 1, reporting in Chicago December 1.

H. S. Martin is transferred to the Leominster Articles Department as special Assistant to the Director of Sales, effective December 1.

F. F. Kaufman is assigned to the New York metropolitan district, effective January 1.

W. E. Tupper is assigned to Mr. Kaufmann's territory (New York State excluding New York City) and Northern Pennsylvania) effective January 1.

The Du Pont Viscoloid Company announces that Leonard Bertoli, formerly sales manager, Fuller-Morrison Drug Company, Chicago, is appointed assistant to the director of sales, assigned to the promotion of wholesale drug sales through the entire United States. Mr. Bertoli's work will be in cooperation with all district managers and salesmen. His headquarters will be in New York.

MOLDED BY GENERAL ELECTRIC

"SAFETY . . . practicability . . . efficiency", the same qualities that give this miner's cap-lamp the approval of the U.S. Bureau of Mines as permissible equipment, prompted the Edison Storage Battery Co. to specify Textolite molded for the lamp housing. ¶The shape of the housing presented a difficult molding problem. ¶The solution of this problem is a tribute to the remarkable qualities of Textolite molded and to the ingenuity of General Electric technicians. ¶In this miner's cap-lamp—and in all Textolite molded products—are incorporated all the experience and technique acquired by General Electric in producing half a billion moldings. ¶Thus Textolite molded, attractive, durable, dielectric, combining General Electric's unexcelled facilities for research and for production, gives *complete* satisfaction to all users of molded parts.

885-25

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY AT 9 P.M., E.S.T. ON A NATION-WIDE N.B.C. NETWORK

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

When writing General Electric Co., please mention *Plastics*

THE SIEMON COMPANY

BRIDGEPORT, CONN.

An organization with 26 years of experience behind it, well qualified as custom moulders. We solicit your inquiries on

Shellac--Bakelite--Colasta

Controlling

The Specialty Insulation Mfg. Co. and The Colasta Co.

Hoosick Falls, N. Y.

The Watertown Mfg Co. **Watertown, Conn**

Expert Bakelite Molding Requires Perfect Dies, Modern Equipment, Skilled Labor

RECTO

Combines these with a knowledge of molding and an understanding of the correct way to apply this knowledge to your product.

"Remember Recto Does It---Better"

Recto Manufacturing Co.

23 W. 3rd Street **Cincinnati, Ohio**

When writing these advertisers, please mention *Plastics*

TRADE NOTES

United States Exports of Nitrocellulose and Acetocellulose Solutions.

During the first six months of 1929, the United States exported $330,660 worth of nitrocellulose and acetocellulose solutions, such as collodion (excluding pyroxylin plastics and paper stocks). The United Kingdom continues to lead as a purchaser of these United States products, taking materials valued at $113,753, Canada second with purchases worth $98,041, and Australia third with $45,379. Exports to Chile amounted to $32,136 and to Mexico $23,635, while Germany, formerly a large taker, purchased only $6,823 worth.

United States Casein Production For 1928

PRODUCTION of casein during 1928 reported by 140 factories, amounted to 22,151,000 pounds, of which nearly one-third (7,053,000 pounds) was manufactured in California; one-fourth (4,936,000 pounds) in the State of New York, and one-fourth (4,966,000 pounds) in Wisconsin. The States of Vermont, Illinois, and Idaho produced respectively 2,111,000 pounds, and 633,000 pounds.

Japanese Celluloid Toy Industry

JAPAN is favorably situated with respect to the production of celluloid toys, since it has adequate supplies of camphor and other materials necessary for the manufacture of pyroxylin plastics. The director of the Tokyo Celluloid Manufacturers' Association estimates the annual production at approximately 5,000,000 yen of which about 80 per cent is exported. (The par value of the yen is $0.4985). The export statistics of the Japanese Department of Finance apparently exaggerate the amount of the trade, since they include under the classification "celluloid toys" various other products, which

are not actually toys. It is estimated that about 50 per cent of the present production of celluloid toys consists of dolls of various sizes and descriptions, 30 per cent of toy animals, and 20 per cent of rattles, trumpets, drums, boats, and various other celluloid novelties.

Statistical data for recent years, compiled from the Annual Return of the Foreign Trade of the Empire of Japan, showing Japanese exports of celluloid toys, are given below:

Country of Destination:	1926 Yen	1927 Yen	1928 Yen
China	98,037	56,455	54,607
India	226,761	302,823	345,837
Great Britain	757,955	816,970	453,315
Germany	70,127	86,789	190,972
Italy	111,893	54,579	56,476
United States	2,003,870	1,490,486	1,550,839
Canada	70,785	87,012	106,060
Mexico	110,792	55,940	101,919
Argentina	154,487	225,410	215,716
Brazil	114,196	159,108	163,655
Australia	238,920	142,295	201,484
All Others	587,818	599,550	788,821
Total	4,545,641	4,077,417	4,229,701

*1 yen equalled $0.4712 in 1926; $0.4741 in 1927, and $0.4640 in 1928.

Solvents and Plasticizers Import Duty Lowered—Czechoslovakia

THe following solvents and plasticizers which are cleared at the customs offices at Aussig, Bodenbach-Tetschen, Bratislava, and Prague and accompanied by a certificate from the appropriate chamber of commerce and industry regarding its use in the manufacture of lacquers have received duty reductions under provisions of a recent decree of the Czech Government: Butyl alcohol, dimethylphthalate, diethyl, phthalate, dibutylphthalate, methyl and ethyl ethers of glycol and their acetates; triphenyl and tricresyl phosphates, cyclohexanone and methyl cyclohexanone.

Editor's Note: This letter, one of six others of similar tone, may be of interest to molding material manufacturers.

The Central Dental Laboratory Company
218-224 South Wabash Avenue
Chicago, September 4, 1929.

Mr. Carl Marx,
Editor of Plastics,
114 E. 32nd St.,
New York City, N. Y.

Dear Sir:

I read the article by Chas. H. Prange on "Synthetic Resins in

American Insulator Corporation

NEW FREEDOM, PA.

PLASTIC MOLDING

COLD MOLDED AND

PHENOLIC PRODUCTS

Sales Offices:

N. Y.: Graybar Building
Chicago: 9 S. Clinton St.
Detroit: General Motors Bldg.
New Haven: Chamber of Commerce Bldg.

PLASTICS

For Every Need

and

HARD RUBBER GOODS

Moulders since 1897

Our experience insures High Grade Economical Production

WE SOLICIT YOUR INQUIRY

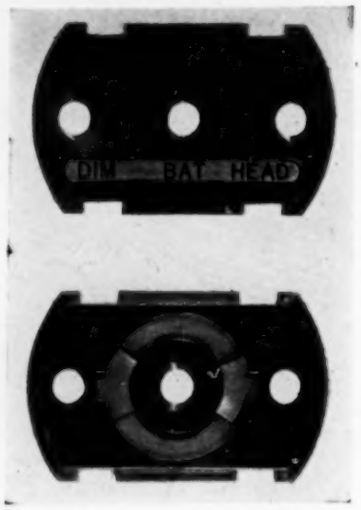
Jos. Stokes RUBBER CO.

Trenton, N. J.

MOULDERS OF PLASTICS & BUILDERS OF MOULDS

An Automotive Part, Accurately Molded In Our Pressroom

KUHN & JACOB
MACHINE & TOOL CO.
TRENTON ~ ~ ~ ~ N.J.



To the ENGLISH MOULDING INDUSTRY

A complete TOOL ROOM SERVICE at the disposal of moulding producers.

We design and manufacture

Single and Multiple impression, portable and semi-automatic, for all makes of plastic moulding compounds and powders.

MOULDS

Consult us on your Mould Problems

PROMPT DELIVERY
Coupled with
SERVICE AFTERWARDS

We invite your enquiries

"IT'S THE MOULD THAT COUNTS"

C.A.V. Jigs, Moulds and Tools Co., Ltd.
Portland Rd., HOVE, Sussex, England
'Phone, Portslade, 8201 **Telegrams, Cavtools, Hove**

When writing these advertisers, please mention *Plastics*

Dentistry," with a great deal of interest.

Mr. Prange seems to have accomplished considerable in realizing the importance of getting after some kind of a Resin material for dental purposes. We would be only too glad to cooperate with any manufacturer who would be willing to experiment with these materials until perfect results are obtained. There is a very large field for anyone who can procure material suitable for dental purposes. Should you know of any one who would be willing to experiment with materials of this nature we would be glad to cooperate until perfect results are obtained.

We have laboratories in Chicago, New York and Baltimore. The experimental laboratory is now located in Chicago where we keep a staff of mechanics doing nothing but experimental work.

Hoping that you will be able to throw some light on this very important subject, I am

Very truly yours,
J. H. GLICK.

Notes on Indian Mica

(*Continued from page 591*)

doubt as to the securing of future Indian supplies now spreading among consumers might be dissipated. The present hand to mouth methods of working will tend to increase the difficulties of subsequent deeper working, and possibly place them outside the economic sphere. Mr. Hobson heard apprehensions expressed that on account of the systematic theft of mica in the largest Indian field (in Bihar) the important producers of mica, as distinct from mere dealers, might be forced out of business.

He adds the significant remark:

"The presence of this systematic theft is apparently as well known to certain large consumers of mica in Great Britain and the United States of

America as it is to the operators in the Bihar field; it is, therefore, a question which has passed from one of purely provincial interest to one of international importance . . . The fact that systematic theft does occur cannot be denied; the producer's mining costs are thereby (according to calculations made) more than doubled, since his costs include those necessary to extract the mica he produces, according to his returns, and those necessary to develop, up to production stage, the mica that is stolen."

Molding Unlikely in India

Discussing the possibilities of micanite production in India in place of export of the raw material, Mr. Hobson is of opinion that the climate might not be suitable for the production of the highest class of work. Many of the shapes demanded by the electrical industries are stamped out by the micanite manufacturers in presses into which the plate is fed in a heated and therefore pliable condition, and is afterwards cooled down, so that when taken out it retains the form impressed upon it. This cooling is assisted by water circulation in the press, and even so a certain "time lag" has to be allowed. In a hot climate the "time lag" would have to be considerably increased, thus reducing the output.

Also deformation after manufacture and before incorporation in the final machine would be a constant danger and a potential source of loss.

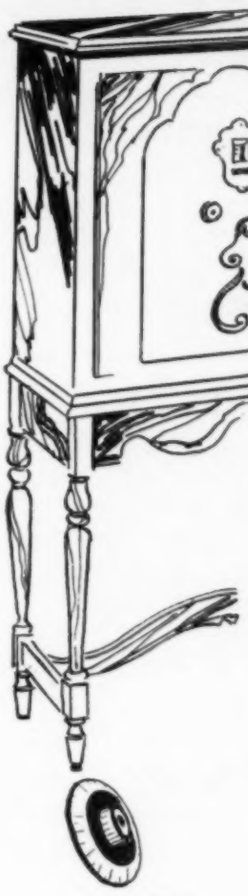
Don-Bar Golf Rack

(*Continued from page 585*)

moved from the mold. Control of the pressure required for ejecting the finished pieces from the mold without breakage was a condition that required the design and use of a special mechanical device for use with this type of molding material.

This resume of the problems involved in the molding of such parts and the manner in which they may be solved are set forth with the purpose of demonstrat-

Norloc service



Reduces COSTS for RADIO INDUSTRY

—and does a better job.

RADIO—that fast-moving industry—that grew big—almost overnight—cut production costs—tremendously—by replacing—many cast metal parts—with plastics—molded the Norloc way. They found them more durable—more accurate—more beautiful in finish.

The perfection of these parts was accomplished for many of the Nationally known radio manufacturers through collaboration with Norloc Engineering and Research Staffs; and they still entrust this molding to Norton Laboratories—because of quality work—quickly delivered—rightly priced.

Have YOU a product—or part of a product—now cast metal, glass, wood, hard rubber, fibre or porcelain that might be molded more economically, whose appearance might be improved, or whose life might be lengthened by supplanting your present material with plastics, molded the Norloc way? Collaboration with our engineering and research staffs will uncover the way, as it has for many others of the nation's prominent concerns.

And on your present plastic molding requirements, let us show you how adequate plant facilities, low overhead, and a working management are reflected in the price, quality and delivery of your needs.

Your inquiries will receive prompt attention. Send one today.

NORTON

LABORATORIES, INC.

LOCKPORT, N. Y.

When writing Norton Laboratories Co., please mention *Plastics*

KURZ-KASCH

Plastic Moulding Headquarters

has been chosen by The Synthetic Plastics Co., a subsidiary of The American Cyanamid Co., as one of the three exclusive molders of

BEETLE MOULDING POWDER

the new light, translucent material.

Plant and
Executive Office,
DAYTON, OHIO

The reputation of Kurz-Kasch moulding has been established by the unflagging zeal of our organization for the finest results. The best materials, equipment and facilities are available, as well as ideal working conditions.

THE KURZ-KASCH CO.

Dayton, Ohio

MOULDERS OF PLASTICS

When writing The Kurz-Kasch Co., please mention *Plastics*

ing the wide possibilities of molded products to the manufacturer who contemplates their use in the assembly of a thousand different articles. In the case of the Don-Bar Golf Club Carrier, molded parts figure prominently in the construction of an article that is an entirely new departure in a line that has tremendous sales possibilities. It is being sold for $22.50 complete with a zipper case, that protects the clubs from dust and dampness off the course; at a price that compares favorably with the traditional bag that is now so thoroughly outmoded by the very practical design of the new rack. The molded parts make such a design possible and together with their sturdy structure and varied color possibilities make up an article that is bound to look attractive to the consumer.

Distributing Molded Specialties

(*Continued from page 584*)

count for itself in the margin of profit, sufficiently at least to offset the extra cost of distribution.

The item shown in this particular ad is the Master Ash Receiver. To give you an inkling as to what might be attained by this method of distribution, we mention that we have sold over a million pieces in eighteen months. This product has reached every corner of the Globe and the end is not yet in sight. Of course, we take advantage of the inquiries to sell other of our products to the same buyers.

Before the Master Ash Receiver, we sold over five million pieces of another item thru similar methods.

CUSTOM MOLDING

BAKELITE—DUREZ—*BEETLE

Our facilities, equipment and experience are at your service. We can supply, *promptly*, molded parts

for Every Need

We are one of the exclusive molders of BEETLE* a new molding material in LIGHT PASTEL COLORS

NORTHERN INDUSTRIAL CHEMICAL CO.

11 ELKINS ST. BOSTON, MASS.

Established in 1908

When writing Northern Industrial Chemical Co., please mention *Plastics*

If anyone is interested in getting a better idea of this method of distribution, we will be glad to send our literature and letter to inquirers.

Of course, we do not wish to leave you with the impression that every type of specialty—molded or otherwise—regardless of its merits can be adopted to this method of distribution. Certain factors are absolutely necessary and we would caution anyone to give the subject thoro study before attempting it. Some of the factors necessary for success is that the product is useful, has a full portion of eye appeal and can be classed as a novelty. Costs of production must be low. Due to the costly method of distribution, the ultimtae price to the consumer must of necessity be high, and the product must command it. Furthermore, you cannot jump into this method of distribution without taking it seriously and giving it as much study and thought as you would any other serious venture. It is primarily a mail order business and someone in your organization must be prepared to follow thru this business to a successful end. Let no one attempt to throw in a few spasmodic ads without great forethought and expect to sell large quantities of merchandise at big profits. If it is not done in a systematic and thoro manner, the chances are very much against you that you will lose all the money you put into the venture. But to those who are willing to take this type of distribution earnestly and have the proper merchandise and true perspective of the business—success is absolutely assured.

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Say you saw it in PLASTICS

Exports of United States Pyroxylin Products, By Countries.
June 1929

Countries	Sheets, rods or tubes Pounds	Sheets, rods or tubes Dollars	Manufacturers Pounds	Manufacturers Dollars
Austria	.....	.....	84	296
Belgium	.....	.....	5	85
Denmark	.....	.....	4	55
Germany	5,432	6,019	36	287
Italy	4,962	5,860	.....	.....
Netherlands	4,216	5,077	28	260
Switzerland	.....	.....	15	216
United Kingdom	184,701	62,616	1,281	2,348
Canada	161,571	135,260	42,669	55,322
B. Honduras	.....	.....	25	54
Guatemala	.....	.....	56	451
Honduras	.....	.....	10	31
Nicaragua	.....	.....	29	144
Panama	12	22	559	1,063
Salvador	26	29	101	553
Mexico	546	456	5,865	8,177
Newfoundland & Labrador	4	8	.....	.....
Bermudas	.....	.....	82	59
Other B. W. Indies	.....	.....	31	75
Cuba	806	863	1,799	2,760
Netherland W. Indies	.....	.....	1,019	595
Haiti, Republic of	.....	.....	10	31
Argentina	.....	.....	789	1,086
Bolivia	.....	.....	78	300
Brazil	117	115	17	140
Chile	358	365	.....	.....
Colombia	.....	.....	407	1,913
Peru	.....	.....	44	128
Venezuela	.....	.....	227	811
China	.....	.....	51	99
Java & Madura	.....	.....	11	99
Hong Kong	75	60	.....	.....
Japan	53	57	.....	.....
Philippine Islands	30	32	1,084	2,131
Soviet Russia in Asia	.....	.....	88	203
Australia	2,485	2,202	10,655	9,307
New Zealand	533	400	271	230
B. E. Africa	8	12	.....	.....
Union of South Africa	409	461	681	822
Total	366,344	219,914	68,111	90,131
Shipments from U. S. to:				
Hawaii	55	14	323	809
Porto Rico	39	52	751	842

Custom Molders

See Advertisers' Index for Detailed Ads of Molders

Manchester Mfg. Co.
Manchester, Vt.
Custom Molders of Novelties
New York Office:
216 Wallabout St., Bklyn.
Telephone: Williamsburg 3872

Boonton Moulding Co.
324 Myrtle Ave.
BOONTON, N. J.
QUALITY CUSTOM MOLDING OF BAKELITE

DIEMOULDING PRODUCTION COMPANY
CANASTOTA, N. Y.
Bakelite Moulded With Engineering Service